YAMAHA

Marine

Water Vehicles

WaveRunner XL1200Ltd

SERVICE MANUAL

LIT-18616-01-98

F0D-28197-Z9-11

NOTICE

This manual has been prepared by the Yamaha Motor Company Ltd. primarily for use by Yamaha dealers and their trained mechanics when performing maintenance procedures and repairs to Yamaha equipment. It has been written to suit the needs of persons who have a basic understanding of the mechanical and electrical concepts and procedures inherent in the work, for without such knowledge attempted repairs or service to the equipment could render it unsafe or unfit for use.

Because the Yamaha Motor Company, Ltd. has a policy of continuously improving its products, models may differ in detail from the descriptions and illustrations given in this publication. Use only the latest edition of this manual. Authorized Yamaha dealers are notified periodically of modifications and significant changes in specifications and procedures, and these are incorporated in successive editions of this manual.

A10001-0*

WaveRunner XL1200Ltd
SERVICE MANUAL

Printed in USA
LIT-18616-01-98

HOW TO USE THIS MANUAL

MANUAL FORMAT

All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations.

In this revised format, the condition of a faulty component will precede an arrow symbol and the course of action required will follow the symbol, e.g.,

- Bearings

  Pitting/scratches → Replace.

To assist you in finding your way through this manual, the section title and major heading is given at the top of every page.

ILLUSTRATIONS

The illustrations within this service manual represent all of the designated models.

CROSS REFERENCES

The cross references have been kept to a minimum. Cross references will direct you to the appropriate section or chapter.

IMPORTANT INFORMATION

In this Service Manual particularly important information is distinguished in the following ways.

⚠ The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

⚠ WARNING

Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the water vehicle.

CAUTION:

A CAUTION indicates special precautions that must be taken to avoid damage to the water vehicle.

NOTE:

A NOTE provides key information to make procedures easier or clearer.

IMPORTANT:

This part has been subjected to change of specification during production.

HOW TO USE THIS MANUAL

① To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

② Numbers are given in the order of the jobs in the exploded diagram.

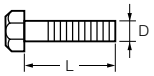
③ Symbols indicate parts to be lubricated or replaced (see "SYMBOLS").

④ A job instruction chart accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.

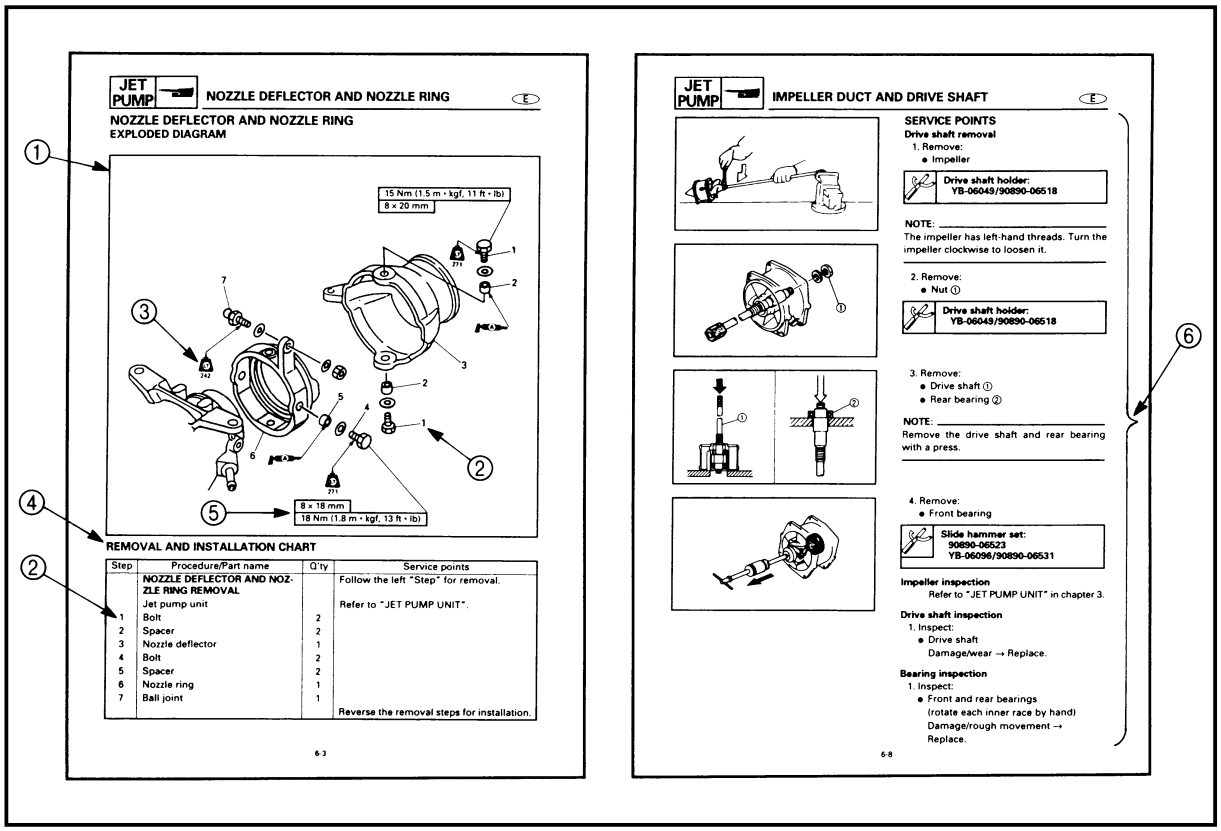
⑤ Dimension figures and the number of parts, are provided for fasteners that require a tightening torque.

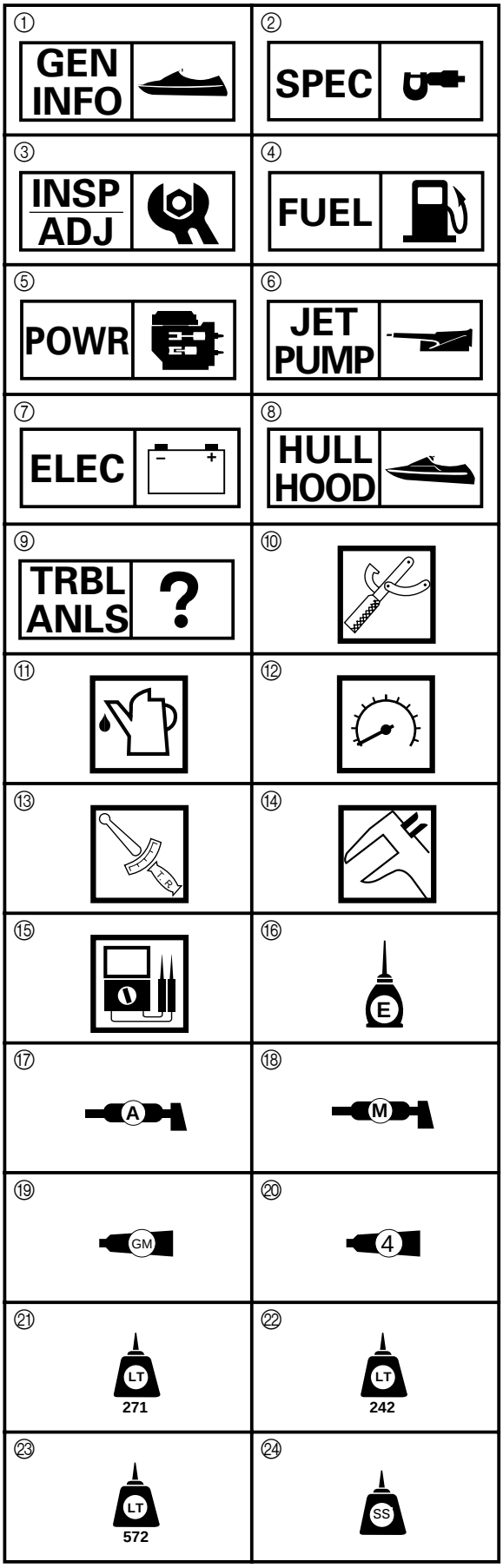
Example:

Bolt or screw size | 10 × 25 mm | : M10 (D) × 25 mm (L)



⑥ Jobs requiring more information (such as special tools and technical data) are described sequentially.





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SYMBOLS

Symbols ① to ⑨ are designed as thumb-tabs to indicate the content of a chapter.

① General Information
② Specifications
③ Periodic Inspection and Adjustment
④ Fuel System
⑤ Power Unit
⑥ Jet Pump Unit
⑦ Electrical System
⑧ Hull and Hood
⑨ Trouble-analysis

Symbols ⑩ to ⑮ indicate specific data:

⑩ Special tool
⑪ Specified liquid
⑫ Specified engine speed
⑬ Specified torque
⑭ Specified measurement
⑮ Specified electrical value
[Resistance (Ω), Voltage (V), Electric current (A)]

Symbol ⑯ to ⑱ in an exploded diagram indicate the grade of lubricant and the location of lubrication point:

⑯ Apply YAMALUBE 2-W oil
⑰ Apply water resistant grease
(Yamaha grease A, Yamaha marine grease)
⑱ Apply molybdenum disulfide grease

Symbols ⑲ to ㉔ in an exploded diagram indicate the grade of the sealing or locking agent, and the location of the application point:

⑲ Apply Gasket Maker®
⑳ Apply Yamabond #4
(Yamaha bond number 4)
㉑ Apply LOCTITE® No. 271 (Red LOCTITE)
㉒ Apply LOCTITE® No. 242 (Blue LOCTITE)
㉓ Apply LOCTITE® No. 572
㉔ Apply silicone sealant

NOTE:

In this manual, the above symbols may not be used in every case.

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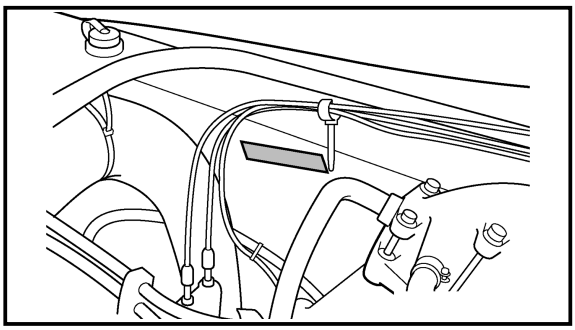
CHAPTER 1
GENERAL INFORMATION

1



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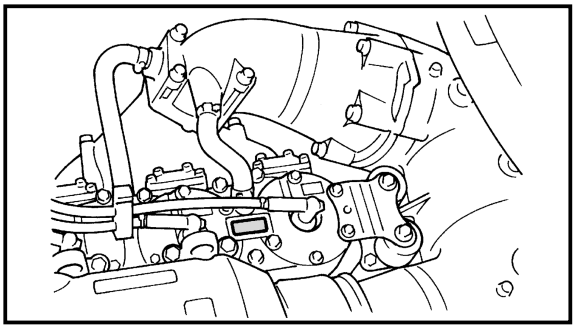
IDENTIFICATION NUMBERS

PRIMARY I.D. NUMBER

The primary I.D. number is stamped on a label attached to the inside of the engine compartment.

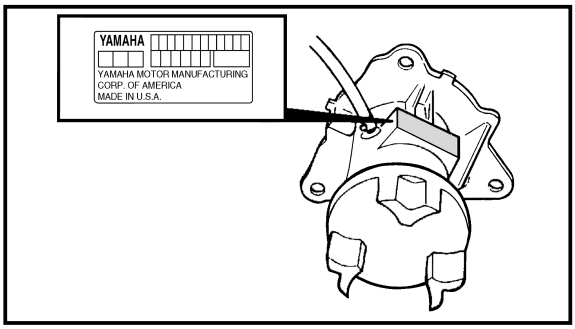
Starting primary I.D. number:
F0D: 800101 ~



ENGINE SERIAL NUMBER

The engine serial number is stamped on a label attached to the cylinder head.

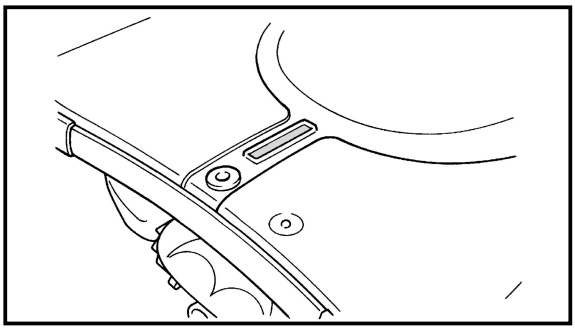
Starting serial number:
66V: 000101 ~



JET PUMP UNIT SERIAL NUMBER

The jet pump unit serial number is stamped on a label attached to the intermediate housing.

Starting serial number:
66V: 800101 ~

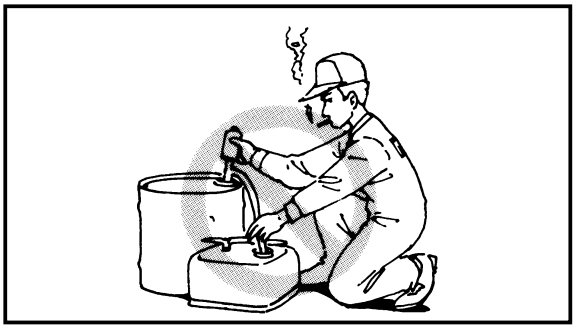


HULL IDENTIFICATION NUMBER (H.I.N.)

The H.I.N. is stamped on a plate attached to the aft deck.

⚠ SAFETY WHILE WORKING

The procedures given in this manual are those recommended by Yamaha to be followed by Yamaha dealers and their mechanics.

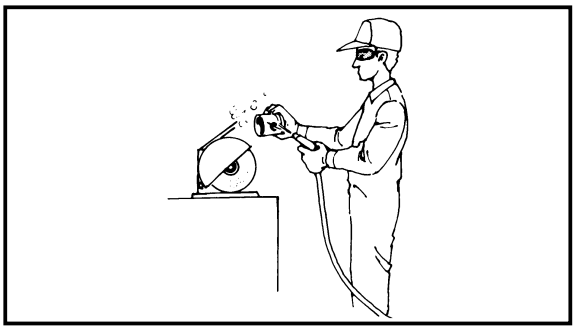


FIRE PREVENTION

Gasoline (petrol) is highly flammable.
Petroleum vapor is explosive if ignited.
Do not smoke while handling gasoline (petrol) and keep it away from heat, sparks, and open flames.

VENTILATION

Petroleum vapor is heavier than air and is deadly if inhaled in large quantities. Engine exhaust gases are harmful to breathe. When test-running an engine indoors, maintain good ventilation.



SELF-PROTECTION

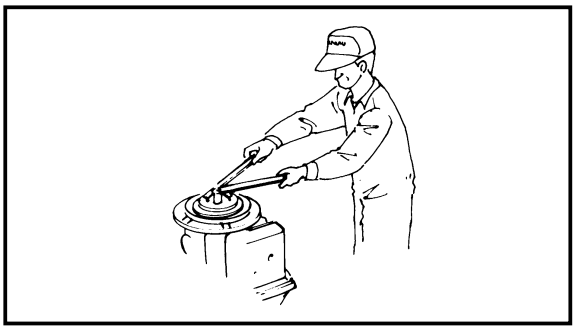
Protect your eyes with suitable safety spectacles or safety goggles when grinding or doing any operation which may cause particles to fly off.
Protect hands and feet by wearing safety gloves or protective shoes if appropriate to the work you are doing.

OILS, GREASES AND SEALING FLUIDS

Use only genuine Yamaha oils, greases, and sealing fluids or those recommended by Yamaha.

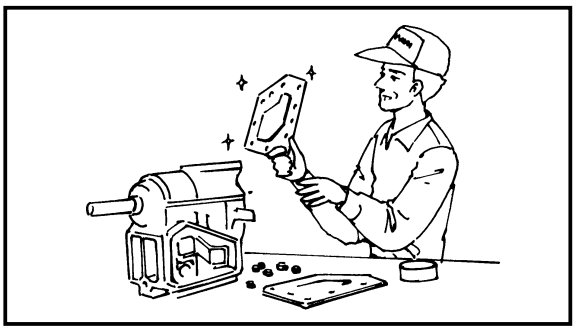
Under normal conditions of use there should be no hazards from the use of the lubricants mentioned in this manual, but safety is all-important, and by adopting good safety practises any risk is minimized. A summary of the most important precautions is as follows:

1. While working, maintain good standards of personal and industrial hygiene.
2. Clothing which has become contaminated with lubricants should be changed as soon as practicable and laundered before further use.
3. Avoid skin contact with lubricants (e.g., do not place a soiled rag in your pocket).
4. Hands and any other part of the body which have been in contact with lubricants or lubricant-contaminated clothing should be thoroughly washed with hot water and soap as soon as practicable.
5. To protect the skin, the application of a suitable barrier cream to the hands before working is recommended.
6. A supply of clean lint-free cloths should be available for wiping purposes.

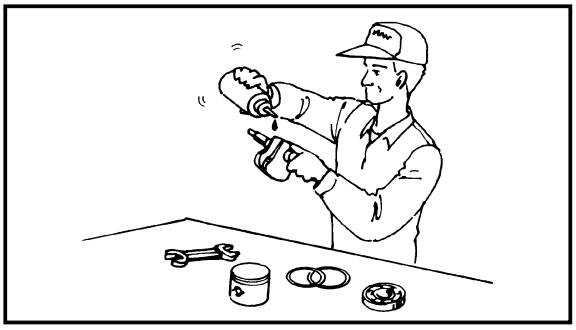


GOOD WORKING PRACTICES

1. **The right tools**
   Use the recommended special tools to protect parts from damage. Use the right tool in the right manner – do not improvise.
2. **Tightening torque**
   Follow the tightening torque instructions. When tightening bolts, nuts and screws, tighten the larger sizes first and tighten inner-positioned fixings before outer-positioned ones.

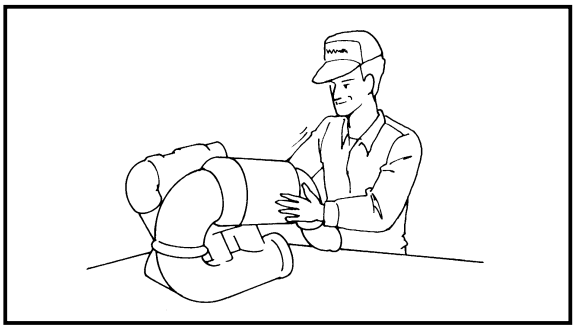


3. **Non-reusable items**
   Always use new gaskets, packings, O-rings, oil seals, split-pins, circlips, etc., on reassembly.



DISASSEMBLY AND ASSEMBLY

1. Clean parts with compressed air when disassembling.
2. Oil the contact surfaces of moving parts during assembly.



3. After assembly, check that moving parts operate normally.

4. Install bearings with the manufacturer's markings on the side exposed to view and liberally oil the bearings.

CAUTION:

Do not spin bearings with compressed air because this will damage their surfaces.

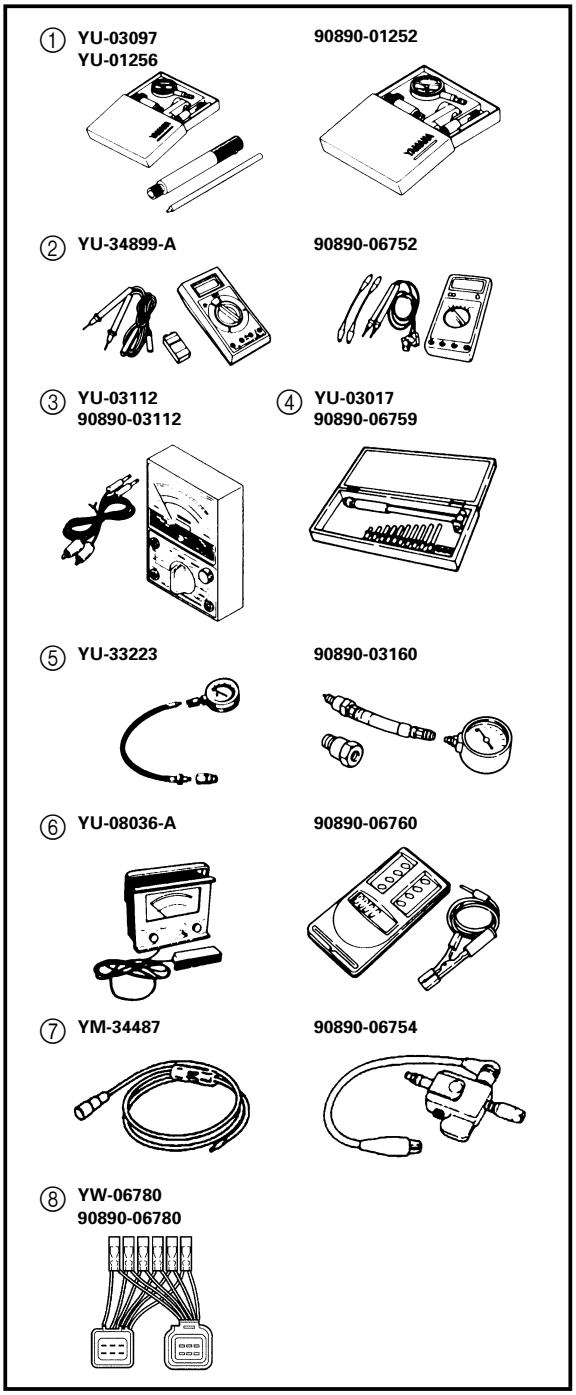
5. When installing oil seals, apply a light coat of water-resistant grease to the outside diameter.

SPECIAL TOOLS

Using the correct special tools recommended by Yamaha, will aid the work and enable accurate assembly and tune-up. Improvisations and using improper tools can damage the equipment.

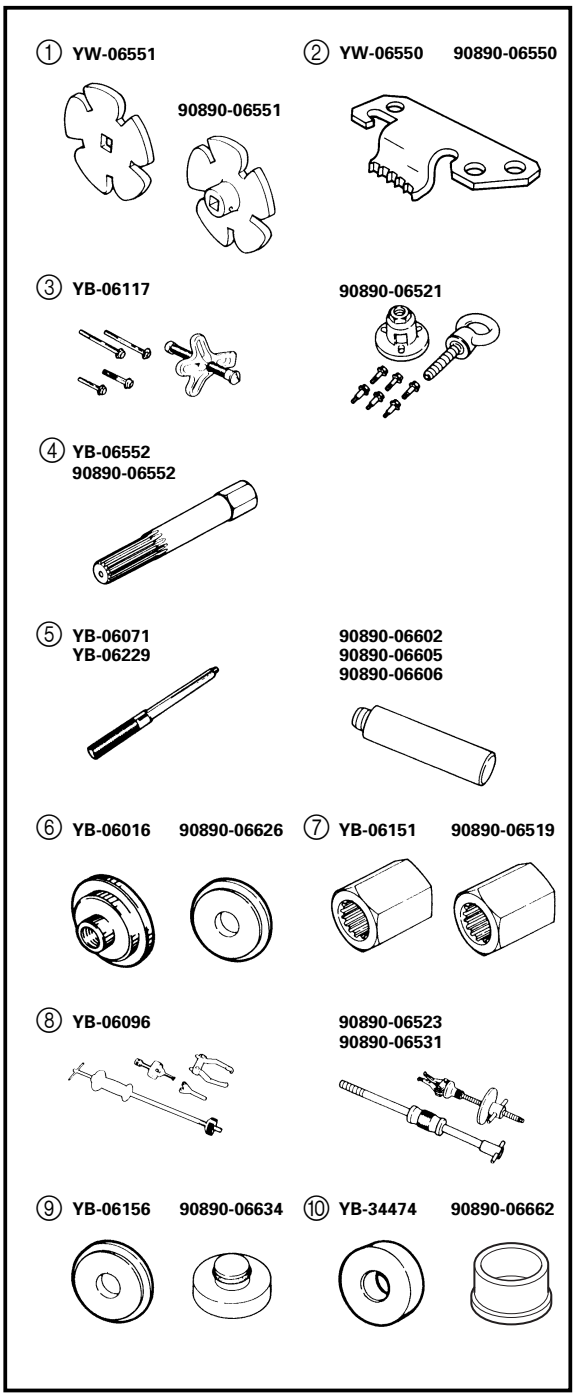
NOTE:

- For U.S.A. and Canada, use part numbers starting with "YB-", "YM-", "YU-" or "YW-".
- For other countries, use part numbers starting with "90890-".



MEASURING

1. Dial gauge and stand
   P/N. YU-03097, YU-01256
   90890-01252
2. Digital multimeter
   P/N. YU-34899-A
   90890-06752
3. Pocket tester
   P/N. YU-03112
   90890-03112
4. Cylinder gauge set
   P/N. YU-03017
   90890-06759
5. Compression gauge
   P/N. YU-33223
   90890-03160
6. Engine tachometer
   P/N. YU-08036-A
   90890-06760
7. Spark gap tester
   P/N. YM-34487
   90890-06754
8. Peak voltage test harness
   P/N. YW-06780
   90890-06780



REMOVAL AND INSTALLATION

1. Coupler wrench
   P/N. YW-06551
   90890-06551
2. Flywheel holder
   P/N. YW-06550
   90890-06550
3. Flywheel puller
   P/N. YB-06117
   90890-06521
4. Shaft holder (intermediate shaft)
   P/N. YB-06552
   90890-06552
5. Driver rod
   (intermediate shaft and jet pump)
   P/N. YB-06071, YB-06229
   90890-06602, 90890-06605,
   90890-06606
6. Bearing outer race attachment
   (intermediate shaft)
   P/N. YB-06016
   90890-06626
7. Drive shaft holder (impeller)
   P/N. YB-06151
   90890-06519
8. Slide hammer set (jet pump bearing)
   P/N. YB-06096
   90890-06523, 90890-06531
9. Ball bearing attachment
   (jet pump oil seal)
   P/N. YB-06156
   90890-06634
10. Bearing inner race attachment
    (jet pump bearing)
    P/N. YB-34474
    90890-06662

CHAPTER 2
SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Unit	Model
		XL1200Ltd
MODEL CODE		
Hull		F0D
Engine		66V
DIMENSIONS		
Length	mm (in)	3,160 (124.4)
Width	mm (in)	1,220 (48.0)
Height	mm (in)	1,130 (44.5)
Dry weight	kg (lb)	354 (780)
Vehicle capacity		3
PERFORMANCE		
Maximum output	kW (PS) @ r/min	114.0 (155) @ 7,000
Maximum fuel consumption	ℓ /h (US gal/h, Imp gal/h)	64.0 (16.9, 14.1)
Cruising range	hr	1.1
ENGINE		
Engine type		2-stroke
Number of cylinders		3
Displacement	cm^3 (cu. in)	1,176 (71.7)
Bore × stroke	mm (in)	80.0 × 78.0 (3.15 × 3.07)
Compression ratio		5.9:1
Intake system		Reed valve
Carburetor model (manufacturer) × quantity		BN44 (MIKUNI) × 3
Enrichment control		Choke valve
Scavenging system		Loop charge
Lubrication system		Variable oil injection
Cooling system		Water cooled
Starting system		Electric starter
Ignition system		Digital CDI
Ignition timing	Degree	18 BTDC ~ 24 BTDC
Spark plug model (manufacturer)		BR8ES-11 (NGK)
Battery capacity	V-Ah (kC)	12 - 19 (68.4)
Lighting coil	A @ r/min	9 ~ 11 @ 6,000
DRIVE UNIT		
Propulsion system		Jet pump
Jet pump type		Axial flow, single stage
Impeller rotation (from rear)		Counterclockwise
Transmission		Direct drive from engine
Nozzle angle (horizontal)	Degree	24 + 24
Nozzle angle (vertical)	Degree	–7, –2, 3, 8, 13
Trim system		Manual 5 positions
Reverse system		Reverse gate

Item	Unit	Model
		XL1200Ltd
FUEL AND OIL		
Fuel		Regular unleaded gasoline
Minimum fuel rating	PON*	86
	RON*	90
Oil		YAMALUBE 2-W*
Fuel/oil mixing ratio (wide open throttle)		30:1
Fuel tank capacity	ℓ (US gal, Imp gal)	70 (18.5, 15.4)
Fuel tank reserve capacity	ℓ (US gal, Imp gal)	12 (3.17, 2.64)
Oil tank capacity	ℓ (US gal, Imp gal)	5.5 (1.45, 1.21)

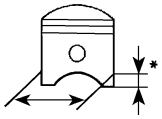
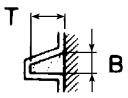
PON*: Pump Octane Number
RON*: Research Octane Number
YAMALUBE 2-W*: YAMALUBE 2-W is developed for this water vehicle and available from a Yamaha water vehicle dealer.

CAUTION:

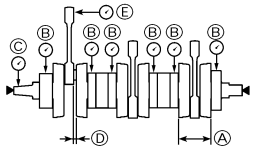
Use only YAMALUBE 2-W oil. Using another oil can seriously damage the catalytic converter and other engine components.

MAINTENANCE SPECIFICATIONS

ENGINE

Item	Unit	Model
		XL1200Ltd
CYLINDER HEAD		
Warpage limit	mm (in)	0.1 (0.004)
Compression pressure*1	KPa (kg/cm²)	500 (5.0)
CYLINDERS		
Bore size	mm (in)	80.000 ~ 80.018 (3.1496 ~ 3.1503)
Taper limit	mm (in)	0.08 (0.003)
Out-of-round limit	mm (in)	0.05 (0.002)
Wear limit	mm (in)	Original cylinder bore + 0.04 (0.0016)
PISTONS		
Diameter 	mm (in)	Red: 79.899 ~ 79.902 (3.1456 ~ 3.1457) Orange: 79.903 ~ 79.906 (3.1458 ~ 3.1459) Green: 79.907 ~ 79.910 (3.1459 ~ 3.1461) Purple: 79.911 ~ 79.914 (3.1461 ~ 3.1462)
Measuring point*	mm (in)	22 (0.87)
Piston-to-cylinder clearance	mm (in)	0.100 ~ 0.105 (0.0039 ~ 0.0041)
Wear limit	mm (in)	Cylinder bore – 0.105 (0.0041)
Piston pin bore inside diameter	mm (in)	22.004 ~ 22.025 (0.8663 ~ 0.8671)
PISTON RINGS 		
Top		
Type		Keystone
Dimensions (B)	mm (in)	1.47 ~ 1.49 (0.058 ~ 0.059)
Dimensions (T)	mm (in)	2.8 ~ 2.9 (0.110 ~ 0.114)
End gap	mm (in)	0.45 ~ 0.60 (0.018 ~ 0.024)
Ring groove clearance	mm (in)	0.02 ~ 0.07 (0.001 ~ 0.003)
2nd		
Type		Keystone
Dimensions (B)	mm (in)	1.47 ~ 1.49 (0.058 ~ 0.059)
Dimensions (T)	mm (in)	2.8 ~ 2.9 (0.110 ~ 0.114)
End gap	mm (in)	0.45 ~ 0.60 (0.018 ~ 0.024)
Ring groove clearance	mm (in)	0.02 ~ 0.07 (0.001 ~ 0.003)
PISTON PINS		
Diameter	mm (in)	21.995 ~ 22.000 (0.8659 ~ 0.8661)
Wear limit	mm (in)	21.990 (0.8657)

*1: At 760 mmHg and 20 ˚C (68 ˚F).

Item	Unit	Model
		XL1200Ltd
CRANKSHAFT ASSEMBLY		
Crank width Ⓐ	mm (in)	72.95 ~ 73.00 (2.872 ~ 2.874)
Deflection limit Ⓑ	mm (in)	0.05 (0.002)
Deflection limit Ⓒ	mm (in)	0.15 (0.006)
Big end side clearance Ⓓ	mm (in)	0.25 ~ 0.75 (0.010 ~ 0.030)
Maximum small end axial play Ⓔ 	mm (in)	2.0 (0.08)
CARBURETORS		
Type		Floatless
Identification mark		#1: 66V-01, #2: 66V-02, #3: 66V-03
Main nozzle	mm (in)	3.2 (0.13)
Main jet		117.5
Pilot jet		87.5
Throttle valve		180
Valve seat size	mm (in)	1.2 (0.05)
Trolling speed	r/min	1,350 ± 50
REED VALVES		
Thickness	mm (in)	0.6 (0.024)
Reed valve stopper height	mm (in)	10.4 ~ 11.0 (0.41 ~ 0.43)
Reed valve warpage limit	mm (in)	0.2 (0.01)

JET PUMP UNIT

Item	Unit	Model
		XL1200Ltd
JET PUMP		
Impeller material		Stainless steel
Number of impeller blades		3
Impeller pitch angle	Degree	15.6
Impeller clearance	mm (in)	0.8 (0.031)
Impeller clearance limit	mm (in)	0.9 (0.035)
Drive shaft runout limit	mm (in)	0.3 (0.012)
Nozzle diameter	mm (in)	86.8 (3.42)

HULL AND HOOD

Item	Unit	Model
		XL1200Ltd
FREE PLAY		
YPVS cable slack	mm (in)	0.5 ~ 1.5 (0.02 ~ 0.06)
Throttle lever free play	mm (in)	4 ~ 7 (0.16 ~ 0.28)

ELECTRICAL

Item	Unit	Model
		XL1200Ltd
BATTERY		
Type		Fluid
Capacity	V-Ah (kC)	12 - 19 (68.4)
CDI UNIT (B/W – B)		
Output peak voltage lower limit		
@cranking 1	V	200
@cranking 2	V	180
@2,000 r/min	V	190
@3,500 r/min	V	180
STATOR		
Pickup coil (W/R – B/O)		
Output peak voltage lower limit		
@cranking 1	V	5
@cranking 2	V	2.8
@2,000 r/min	V	7.9
@3,500 r/min	V	11
Lighting coil (G – G)		
Output peak voltage lower limit		
@cranking 1	V	9
@cranking 2	V	9
@2,000 r/min	V	14
@3,500 r/min	V	14
Pickup coil resistance	Ω (color)	445 ~ 545 (W/R – B/O)
Lighting coil resistance	Ω (color)	0.49 ~ 0.59 (G – G)
Minimum charging current	A @ r/min	9 @ 6,000
IGNITION COIL		
Minimum spark gap	mm (in)	10 (0.39)
Primary coil resistance	Ω (color)	0.26 ~ 0.36 (B/W – Ground)
Secondary coil resistance	kΩ (color)	3.5 ~ 4.7 (B/W – Spark plug lead terminal)
Spark plug lead resistance		
#1	kΩ	6.1 ~ 14.3
#2	kΩ	4.6 ~ 11.1
#3	kΩ	3.1 ~ 7.7

Cranking 1: unloaded
Cranking 2: loaded

Item	Unit	Model
		XL1200Ltd
RECTIFIER/REGULATOR (R – B)		
Output peak voltage lower limit		
@cranking 1	V	—
@cranking 2	V	7
@2,000 r/min	V	12.6
@3,500 r/min	V	12.6
STARTER MOTOR		
Brush length	mm (in)	12.5 (0.49)
Wear limit	mm (in)	6.5 (0.26)
Commutator undercut	mm (in)	0.7 (0.03)
Limit	mm (in)	0.2 (0.01)
Commutator diameter	mm (in)	28.0 (1.10)
Limit	mm (in)	27.0 (1.06)
FUSE		
Rating	V-A	12-10 12-20

Cranking 1: unloaded
Cranking 2: loaded

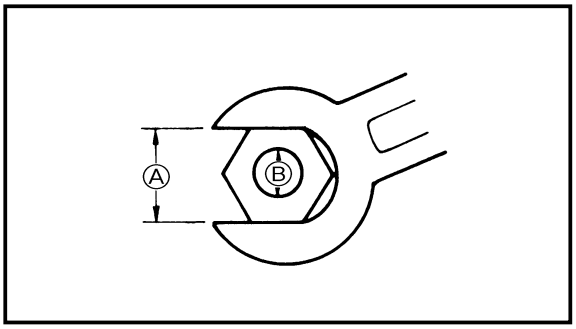
TIGHTENING TORQUES

SPECIFIED TORQUES

Part to tightened		Part name	Thread size	Q'ty	Tightening torque			Remarks
					Nm	m•kg	ft•lb	
ENGINE								
Exhaust chamber/stay – bracket		Bolt	M10	2	40	4.0	29	LT 271
Exhaust chamber stay/ cylinder head – cylinder	1st	Bolt	M8	2	15	1.5	11	
	2nd				36	3.6	26	
Exhaust chamber joint – exhaust manifold		Bolt	M10	4	40	4.0	29	LT 271
Muffler cover – muffler		Bolt	M6	3	12	1.2	8.7	LT 242
Exhaust chamber – exhaust chamber joint		Bolt	M10	6	40	4.0	29	LT 271
Hanger – cylinder head		Bolt	M10	4	40	4.0	29	LT 271
Muffler stay – cylinder body		Bolt	M10	2	40	4.0	29	LT 271
Muffler stay 2 – crankcase		Bolt	M10	2	40	4.0	29	LT 271
Muffler – stay		Bolt	M10	3	40	4.0	29	LT 271
Muffler – catalyst housing	1st	Bolt	M8	6	15	1.5	11	LT 271
	2nd				34	3.4	25	
Muffler – mixing joint	1st	Bolt	M8	6	12	1.2	8.8	LT 271
	2nd				23	2.3	17	
Exhaust temperature sensor – muffler		—	—	1	40	4.0	29	LT 572
Water temperature sensor – mixing joint		—	—	1	20	2.0	14	LT 572
Muffler – hanger		Nut	M10	2	40	4.0	29	LT 271
Exhaust manifold – cylinder	1st	Bolt	M10	10	23	2.3	17	LT 271
	2nd				40	4.0	29	
	1st	Nut	M10	2	15	1.5	11	LT 271
	2nd				40	4.0	29	
Joint pipe – exhaust manifold		Bolt	M6	6	12	1.2	8.7	LT 242
Electrical box – hull		Bolt	M8	4	17	1.7	12	LT 572
Engine – engine mount		Bolt	M8	4	17	1.7	12	LT 572
Reed valve – reed valve base		Screw	M4	24	1	0.1	0.7	LT 242
YPVS cable holder/valve cover – cylinder		Bolt	M6	2	10	1.0	7.2	LT 572
YPVS valve cover – cylinder		Bolt	M6	10	10	1.0	7.2	LT 572
YPVS valve holder – shaft		Bolt	M5	3	4	0.4	2.9	LT 242
Spark plug – cylinder head		Bolt	M14	3	25	2.5	18	
Cylinder head cover/ cylinder head – cylinder	1st	Bolt	M8	22	23	2.3	17	
	2nd				23	2.3	17	
	3rd				36	3.6	26	
Cylinder – crankcase	1st	Bolt	M10	12	22	2.2	16	LT 572
	2nd				40	4.0	29	
Generator cover – crankcase	1st	Bolt	M10	8	15	1.5	11	LT 271
	2nd				51	5.1	37	

Part to tightened		Part name	Thread size	Q'ty	Tightening torque			Remarks
					Nm	m•kg	ft•lb	
Stator coil – generator cover		Bolt	M6	3	15	1.5	11	5 242
Flywheel magneto – crankshaft		Bolt	M10	1	75	7.5	54	E
Upper crankcase – lower crankcase	1st	Bolt	M8	17	15	1.5	11	
	2nd				28	2.8	20	
			M6	10	11	1.1	8.0	
Engine bracket – lower crankcase	1st	Bolt	M8	6	15	1.5	11	5 271
	2nd				28	2.8	20	
Drive coupling – crankshaft		Coupling	M27	1	37	3.7	27	5 572
Intake silencer plate/carburetor – cylinder		Bolt	M6	6	11	1.1	8.0	
Carburetor assembly – cylinder	1st	Bolt	M8	6	12	1.2	8.7	5 242
	2nd				23	2.3	17	
		Bolt	M6	4	12	1.2	8.7	5 242
JET PUMP UNIT								
Impeller (left-hand threads) – drive shaft		Bolt	M20	1	18	1.8	13	5 572
Driven coupling – shaft		Coupling	M27	1	37	3.7	27	5 572
Bearing housing – hull		Bolt	M8	3	17	1.7	12	5 271
Intake screen – hull		Bolt	M6	4	8	0.8	5.8	5 572
Intake duct – hull		Bolt	M8	4	17	1.7	12	5 572
Jet pump cover – hull		Bolt	M8	4	17	1.7	12	5 572
Nozzle deflector – nozzle ring		Bolt	M8	2	16	1.6	12	5 271
Nozzle ring – nozzle		Bolt	M8	2	16	1.6	12	5 271
Drive shaft nut – drive shaft		Nut	M16	1	70	7.0	51	
Transom plate – hull		Nut	M10	4	27	2.7	20	
HULL AND HOOD								
Fuel tank belt – hull		Bolt	M8	4	17	1.7	12	5 572
Handlebar holder – steering master		Bolt	M8	4	16	1.6	12	5 271
Steering master – deck		Nut	M8	4	20	2.0	14	
Seat lock assembly – seat		Bolt	M6	4	7	0.7	5.1	5 572
Seat lock notch – deck		Nut	M10	2	26	2.6	19	
Bow eye – hull		Nut	M8	2	16	1.6	12	
Cleat – deck		Nut	M8	2	16	1.6	12	
Engine mount – hull		Bolt	M8	8	17	1.7	12	5 572

Nut Ⓐ	Bolt Ⓑ	General torque specifications		
		Nm	m•kg	ft•lb
8 mm	M5	5.0	0.5	3.6
10 mm	M6	8.0	0.8	5.8
12 mm	M8	18	1.8	13
14 mm	M10	36	3.6	25
17 mm	M12	43	4.3	31

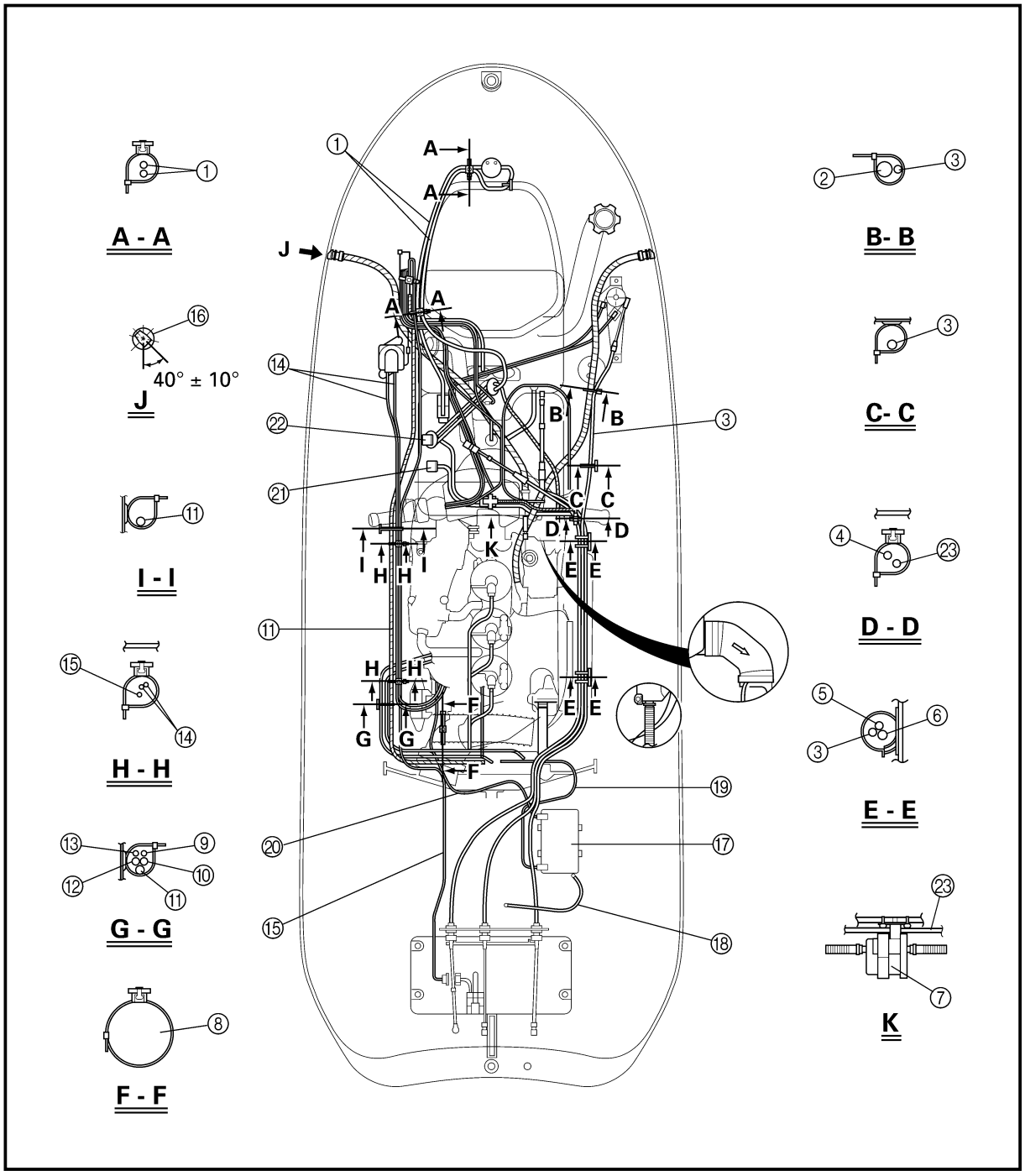


GENERAL TORQUE

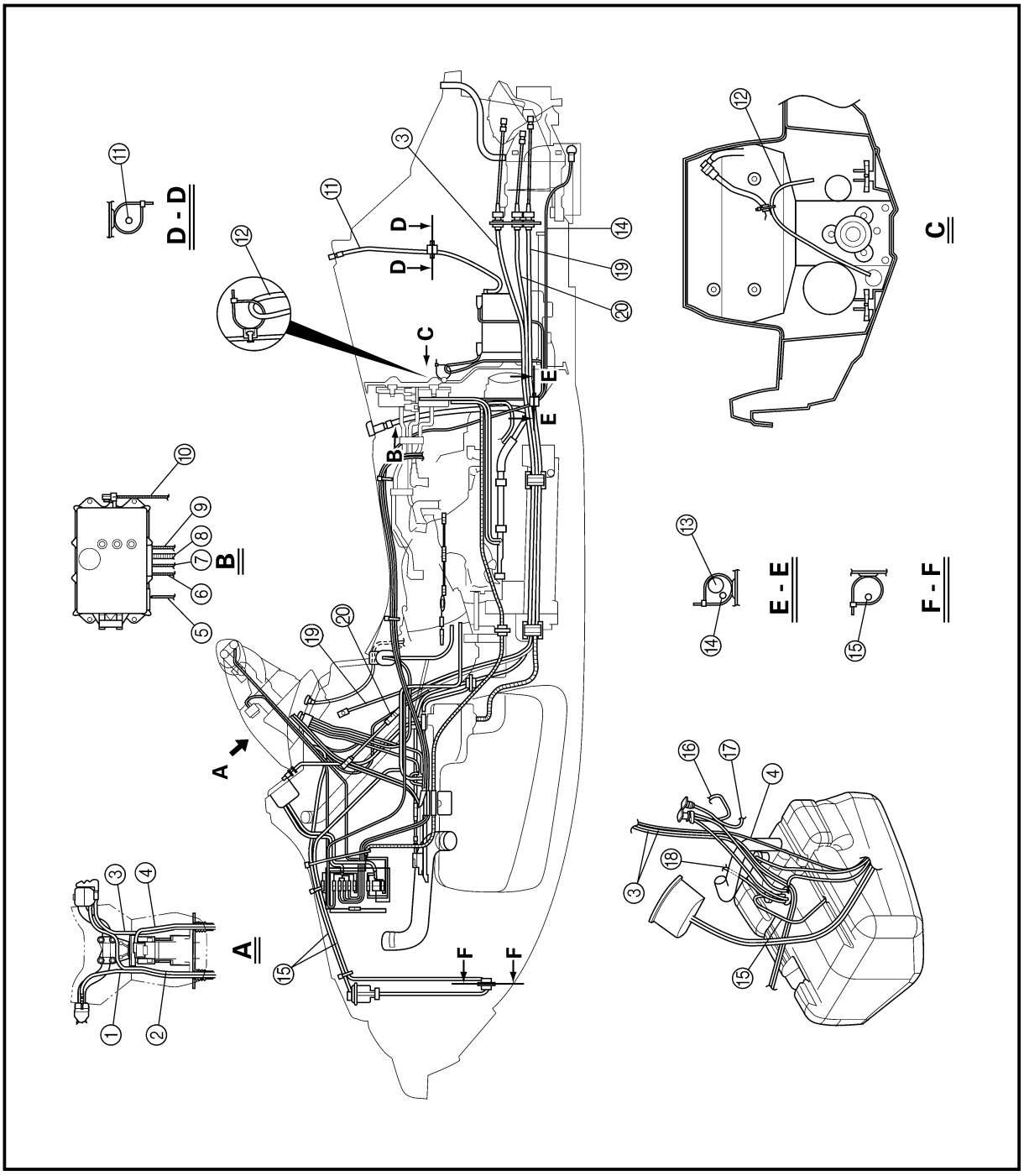
This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided in applicable sections of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross fashion and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads.

Components should be at room temperature.

CABLE AND HOSE ROUTING



① Fuel breather hose
② Pilot water hose
③ QSTS cable
④ Fuel hose
⑤ Shift cable
⑥ Steering cable
⑦ Fuel filter
⑧ Ventilation hose
⑨ Ground lead
⑩ Starter motor lead
⑪ Electrical box lead
⑫ Generator lead
⑬ Pickup coil lead
⑭ YPVS cable
⑮ Speed sensor lead
⑯ Pilot water outlet
⑰ Battery
⑱ Battery breather hose
⑲ Battery positive lead
⑳ Battery negative lead
㉑ Choke knob
㉒ Fuel cock
㉓ Choke cable



① Throttle cable
② Switch box lead
③ QSTS cable
④ Buzzer lead
⑤ To pickup coil
⑥ To battery positive terminal
⑦ To starter motor
⑧ To multi-function meter
⑨ To water/exhaust temperature sensor
⑩ To generator
⑪ Battery breather hose
⑫ Battery negative lead
⑬ Water hose
⑭ Speed sensor lead
⑮ Fuel breather hose
⑯ To fuel filter
⑰ Choke cable
⑱ Fuel return hose
⑲ Shift cable
⑳ Steering cable

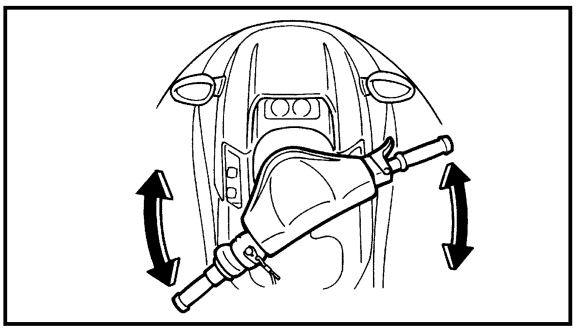
CHAPTER 3
PERIODIC INSPECTION AND ADJUSTMENT

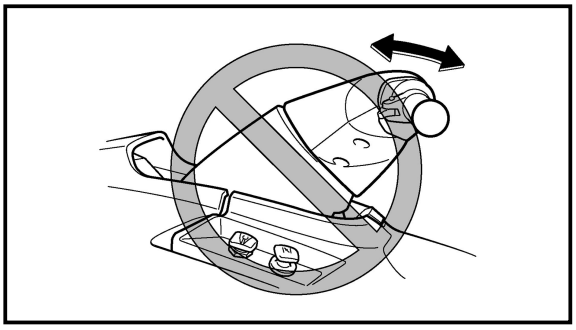
MAINTENANCE INTERVAL CHART

The following chart should be considered strictly as a guide to general maintenance intervals. Depending on operating conditions, the intervals of maintenance should be changed.

Item	Remarks	Initial		Every		Refer to page
		10 hours (Break-in)	50 hours (3 months)	100 hours (6 months)	200 hours (1 year)	
CONTROL SYSTEM						
Steering cable	Inspect/adjust			○		3-2
Steering master	Inspect	○		○		3-2
Throttle cable	Inspect/adjust			○		3-3
Carburetor throttle shaft	Inspect/adjust			○		—
Choke cable	Inspect/adjust			○		3-4
Shift cable	Inspect/adjust			○		3-6
QSTS	Inspect/adjust			○		3-4
YPVS	Inspect/adjust				○	3-7
FUEL SYSTEM						
Fuel tank	Clean				○	4-7
Fuel filter	Clean/replace	○			○	3-9
Fuel line	Inspect			○		—
Trolling speed	Check/adjust			○		3-9
Carburetor setting	Inspect/adjust	○		○		4-16
OIL INJECTION SYSTEM						
Oil injection system	Check/clean	○			○	3-10
Oil pump cable	Inspect/adjust			○		4-31
POWER UNIT						
Spark plugs	Inspect/clean/adjust	○	○	○		3-11
Cooling-water passage	Inspect/clean		○ *3			—
Rubber coupling	Inspect				○	—
ELECTRICAL						
Battery	Inspect	○ *4				3-12
JET PUMP UNIT						
Impeller	Inspect		○	○		3-15
Water inlet filter	Clean		○	○		3-16
Bilge strainer	Clean		○	○		3-16
GENERAL						
Bolts and nuts	Retighten	○		○		—
Drain plugs	Inspect/replace				○	3-16
Lubrication points	Grease			○		3-17
Bearing housing	Grease	○ *1		○ *2		3-18

*1: Grease capacity 33.0 ~ 35.0 cm^3 (1.11 ~ 1.18 oz.)
*2: Grease capacity 6.0 ~ 8.0 cm^3 (0.20 ~ 0.27 oz.)
*3: After every ride
*4: Inspect fluid level before every ride





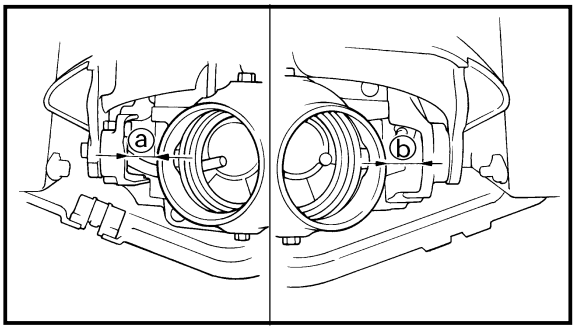
PERIODIC SERVICE

CONTROL SYSTEM

Steering master inspection

1. Inspect:
   - Steering master
     Excessive play → Replace the steering master.
     Refer to "STEERING MASTER" in chapter 8.

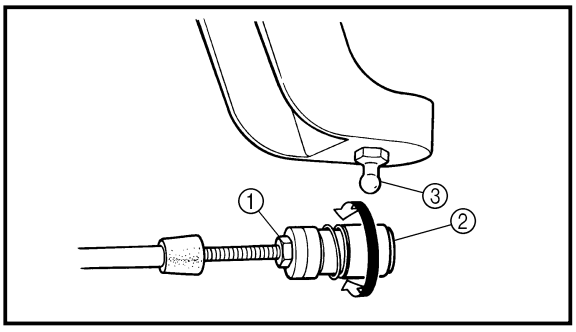
Inspection steps:
- Move the handlebar up and down and back and forth.
- Check the excessive play of the handlebar.



Steering cable inspection and adjustment

1. Inspect:
   - Jet nozzle clearance ⓐ, ⓑ
     Difference → Adjust.

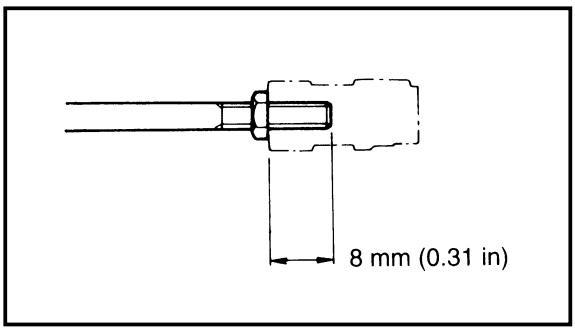
Inspection steps:
- Turn the handlebar from lock to lock.
- Measure clearances ⓐ and ⓑ.
- If clearances ⓐ and ⓑ are not the same, adjust them.



2. Adjust:
   - Steering cable joint
     (steering column side)

Adjustment steps:
- Loosen the locknut ①.
- Disconnect the steering cable joint ② from the ball joint ③.
- Turn the cable joint in or out for adjusting the clearance.

Turn in	**Clearance ⓐ is increased.**
Turn out	**Clearance ⓑ is increased.**



⚠ WARNING

The cable joint must be screwed in more than 8 mm (0.31 in).

- Connect the cable joint and tighten the locknut.

Locknut:
7 Nm (0.7 m • kg, 5.1 ft • lb)

NOTE:

If the steering cable cannot be properly adjusted at the steering column side, make adjustments at the jet pump side.

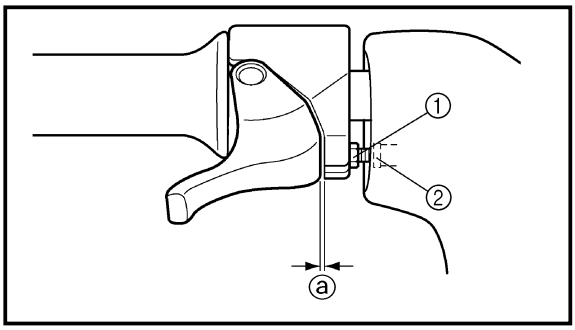
Throttle cable inspection and adjustment

NOTE:

Before adjusting the throttle lever free play, adjust the trolling speed.

1. Measure:
   - Throttle lever free play ⓐ
     Out of specification → Adjust.

Throttle lever free play:
4 ~ 7 mm (0.16 ~ 0.28 in)



2. Adjust:
   - Throttle lever free play

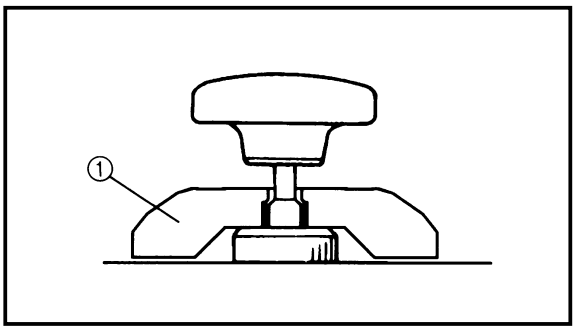
Adjustment steps:
- Loosen the locknut ①.
- Turn the adjuster ② in or out until the specified free play is obtained.

Turn in	**Free play is increased.**
Turn out	**Free play is decreased.**

- Tighten the locknut.

⚠ WARNING

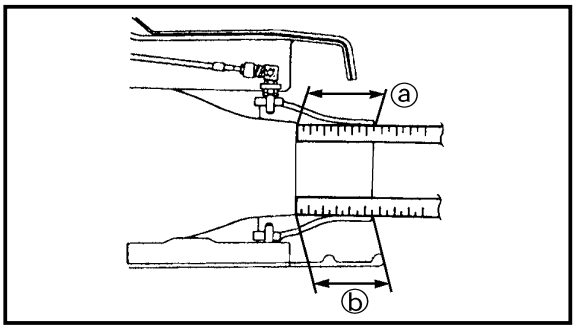
After adjusting the free play, turn the handlebar to the right and left and make sure that the trolling speed does not increase.



Choke cable inspection and adjustment

1. Inspect:
   - Choke knob
     (pull the choke knob all the way out)
     Choke knob automatically returns → Adjust.

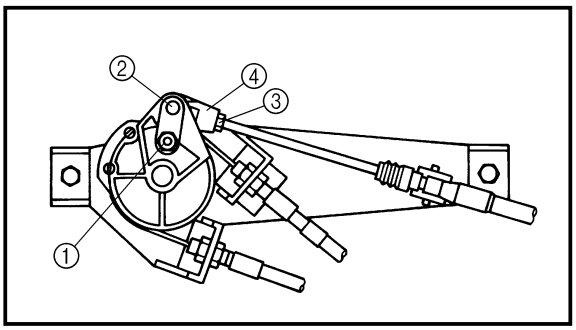
Adjustment steps:
- Turn in the adjusting nut ① until the choke knob does not automatically return.

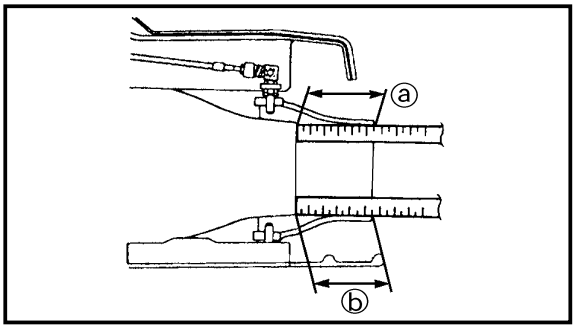


QSTS cable inspection and adjustment

1. Measure:
   - Nozzle deflector set length ⓐ, ⓑ
     Difference → Adjust.

Measurement steps:
- Set the control grip in the neutral position.
- Set the jet nozzle in the center position.
- Measure the nozzle deflector set length ⓐ and ⓑ.
- If ⓐ and ⓑ length are not even, adjust the cable joint.





2. Adjust:
   - QSTS cable

Adjustment steps:
- Set the control grip in the neutral position.
- Set the jet nozzle in the center position.
- Remove the nut ① and pivot pin ②.
- Loosen the locknut ③.
- Turn the cable joint ④ for adjusting.

Turn in	**Length ⓑ is increased.**
Turn out	**Length ⓐ is increased.**

⚠ WARNING

The cable joint must be screwed in more than 8 mm (0.31 in).

- Connect the cable joint ④ and pivot pin ② and tighten the nut ①.

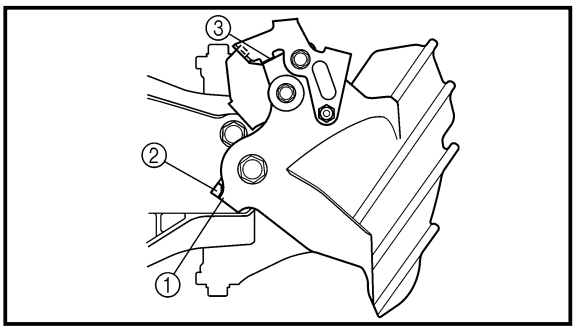
Nut:
4 Nm (0.4 m • kg, 2.9 ft • lb)

- Tighten the locknut ③.

Locknut:
4 Nm (0.4 m • kg, 2.9 ft • lb)

NOTE:

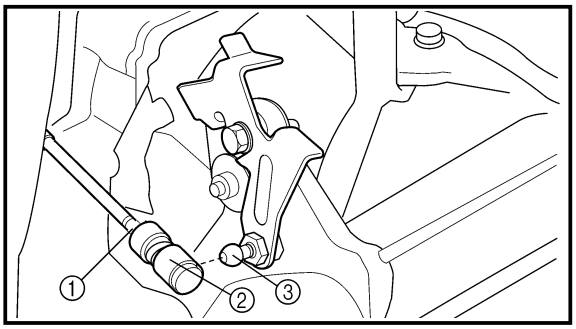
If correct adjustment by using the cable joint at the wheel end is not obtained, adjust the cable joint on the trim nozzle end.



Shift cable inspection and adjustment

1. Check:
   - Reverse gate stopper lever position
     Incorrect → Adjust.

Checking steps:
- Set the shift lever to the reverse position.
- Check to make sure the reverse gate ① contacts the stopper ② on the bracket and the lever ③ contacts the reverse gate.



2. Adjust:
   - Shift cable joint

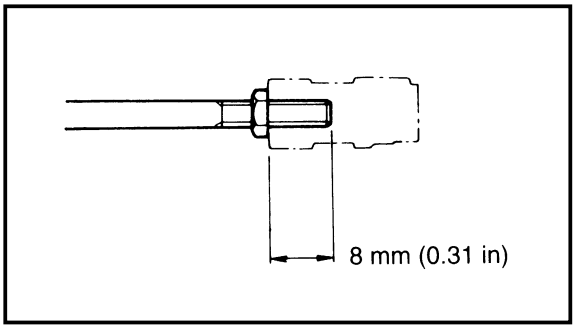
Adjustment steps:
- Loosen the locknut ①.
- Disconnect the cable joint ② from the ball joint ③.
- Turn the cable joint to align it with the ball joint.

Turn in	**Shortens.**
Turn out	**Lengthens.**

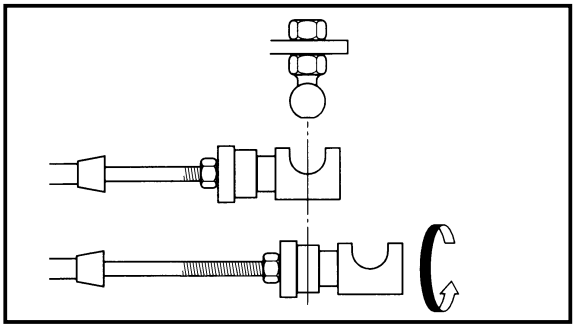
- Turn out the cable joint nine times from the aligned position.

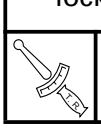
⚠ WARNING

The cable joint must be screwed in more than 8 mm (0.31 in).



- Connect the cable joint and tighten the locknut.





Locknut:
3 Nm (0.3 m • kg, 2.2 ft • lb)

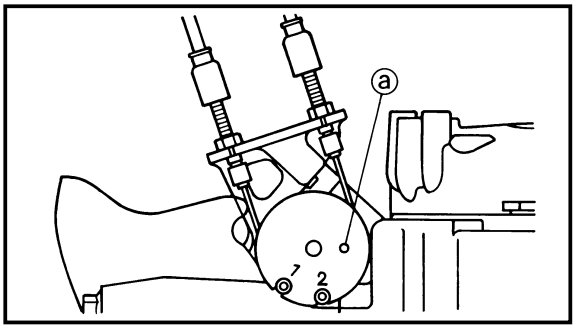
YPVS cable adjustment

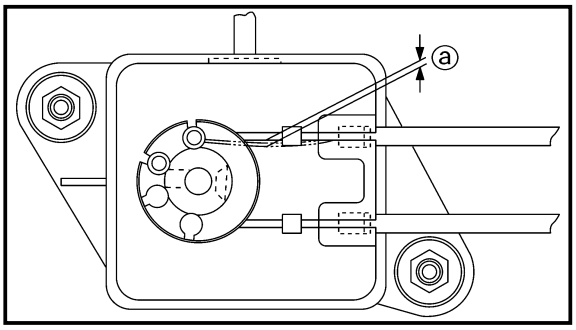
1. Check:
   - YPVS valve position
     Incorrect position → Adjust the YPVS cable.

Checking steps:
- Initiate the multi-function meter "START" mode so the display comes on.
- Start the engine and then stop it.

NOTE:
When the engine has been stopped for 3 seconds, the YPVS valve assembly will extend and retract one time.

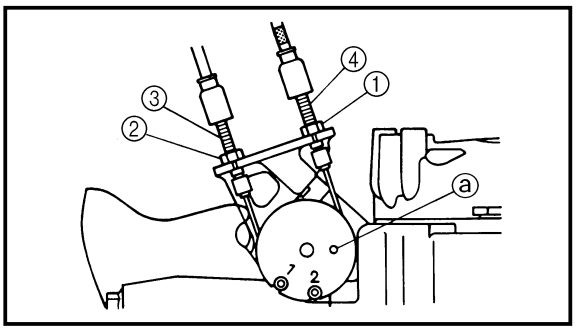
- Check that the hole ⓐ in the pulley is aligned with the hole in the cylinder when the YPVS valve is fully closed.





2. Measure:
   - YPVS cable slack ⓐ
     Out of specification → Adjust.

YPVS cable slack:
0.5 ~ 1.5 mm (0.02 ~ 0.06 in)



3. Adjust:
   - YPVS cables 1 and 2

Adjustment steps:
- Loosen locknuts ① and ②.
- Turn in the adjuster ③ and ④ until there is slack in the cable.
- Align the hole ⓐ in the pulley with the hole in the cylinder.
- Insert a 4-mm-diameter pin through the holes in the pulley and cylinder.
- Turn the adjuster ③ and ④ in or out until the specified slack is obtained.

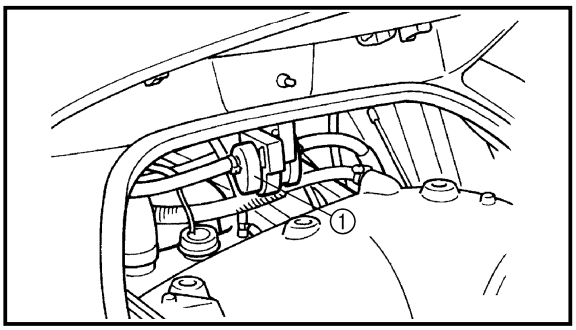
Turn in	**Slack is increased.**
Turn out	**Slack is decreased.**

- Finger tighten the locknut ① and ②.
- Remove the pin.
- Start and stop the engine.
- Recheck the hole alignment.
- If the hole alignment is correctly, tighten the locknut.
- If the hole alignment is incorrect, repeat the above steps.

FUEL SYSTEM

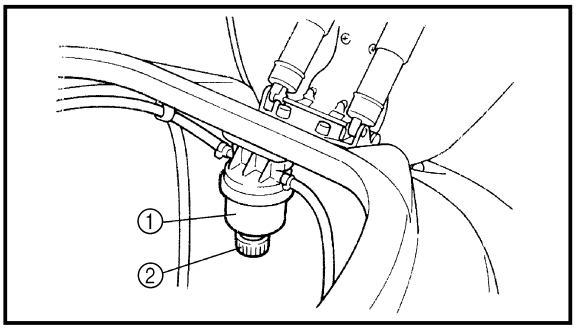
⚠ WARNING

- **Stop the engine, set the fuel cock to "OFF" and loosen the fuel filler cap before servicing the fuel system.**
- **When removing fuel system parts, wrap them in a cloth and take care that no fuel spills into the engine compartment.**



Fuel line inspection

1. Inspect:
   - Fuel filter ①
     Contaminants → Replace.
     Cracks/damage → Replace.
     Water contamination → Replace and check the fuel tank.
   - Fuel hose
   - Fuel tank
   - Fuel hoses through part
   - Fuel filler cap
     Cracks/damage → Replace.



2. Inspect:
   - Water separator ①
     Water accumulation → Drain.

NOTE:

If need the water draining, remove the drain plug ②.

Trolling speed check and adjustment

1. Check:
   - Trolling speed
     Out of specification → Adjust.

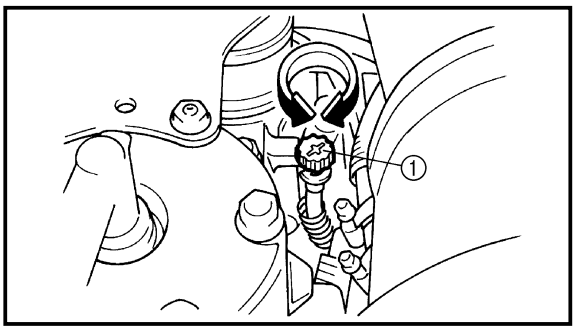
	Trolling speed: **1,350 ± 50 r/min**

Checking steps (with the vehicle in the water):

- Start the engine and allow it to warm up for several minutes.
- Attach the engine tachometer to the spark plug lead.

	Engine tachometer: **YU-8036-A/90890-06760**

- Measure the engine trolling speed.

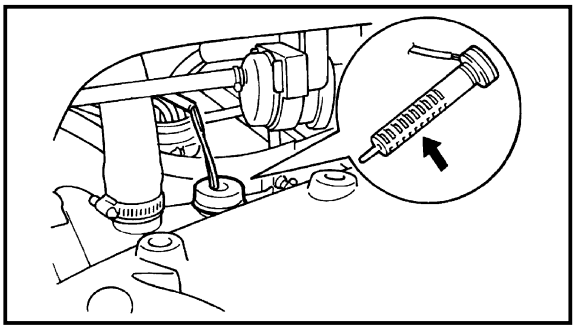


2. Adjust:
   - Trolling speed

Adjustment steps:
- Start the engine and allow it to warm up for several minutes.
- Attach the engine tachometer to the spark plug lead.

Engine tachometer:
YU-8036-A/90890-06760

- Turn the remote throttle stop screw ① in or out until the specified trolling speed is obtain.



OIL INJECTION SYSTEM

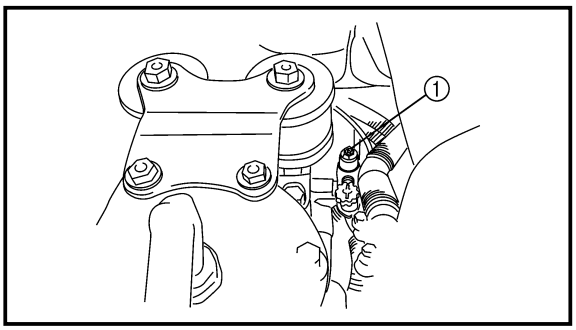
Oil filter inspection

1. Inspect:
   - Oil filter
     Contaminants → Clean.
     Frays/tears → Replace.
   - Rubber seal
     Cracks/wear → Replace.

Oil injection pump air bleeding

NOTE:

Bleed the oil injection system if:
- the system has been disassembled, or
- the oil has been completely depleted during operation.



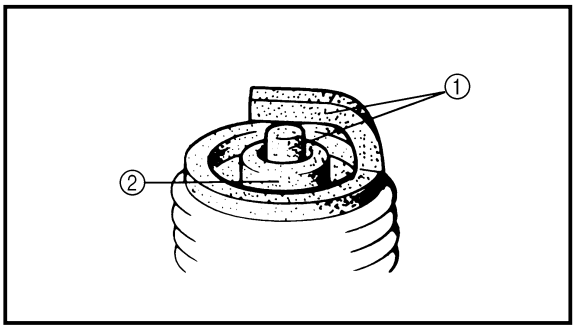
1. Bleed:
   - Air

Air bleeding steps:
- Place rags around the air bleed screw ① to catch any oil that might spill.
- Fill the oil tank with oil.

Recommended engine oil:
YAMALUBE 2-W oil only

- Loosen the air bleed screw ① two full turns and make sure that both the oil and air bubbles flow out.
- When there are no air bubbles left, tighten the air bleed screw.
- Wipe up any spilt oil.

Screw:
5 Nm (0.5 m • kg, 3.6 ft • lb)



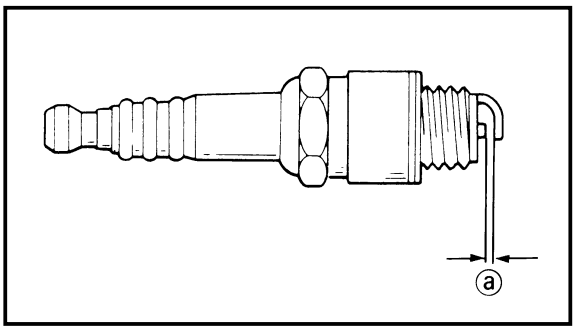
POWER UNIT

Spark plug inspection

1. Inspect:
   - Electrodes ①
     Damage/wear → Replace.
   - Insulator color ②
     Distinctly different color → Check the engine condition.

Color guide:
Medium to light tan color:
Normal
Whitish color:
Lean fuel mixture
Air leak
Incorrect settings
Blackish color:
Overly rich mixture
Electrical malfunction
Excessive oil use
Defective spark plug

2. Clean:
   - Spark plug
     (with a spark plug cleaner or wire brush)



3. Measure:
   - Spark plug gap ⓐ
     Out of specification → Regap.

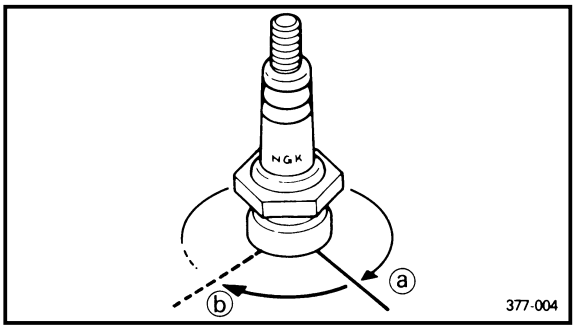
	Spark plug gap: **1.0 ~ 1.1 mm (0.039 ~ 0.043 in)**

4. Tighten:
   - Spark plug

	Spark plug: **25 Nm (2.5 m • kg, 18 ft • lb)**

NOTE:

- Before installing the spark plug, clean the gasket surface and spark plug surface. Also, it is suggested to apply a thin film of anti-seize compound to the spark plug threads to prevent thread seizure.
- If a torque wrench is not available, a good estimate of the correct tightening torque for a new spark plug is to finger tighten ⓐ the spark plug and then tighten it another 1/4 to 1/2 of a turn ⓑ.



ELECTRICAL

Battery inspection

⚠ WARNING

Battery electrolyte is dangerous; it contains sulfuric acid which is poisonous and highly caustic.

Always follow these preventive measures:

- **Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.**
- **Wear protective eye gear when handling or working near batteries.**

Antidote (EXTERNAL):
- **SKIN - Wash with water.**
- **EYES - Flush with water for 15 minutes and get immediate medical attention.**

Antidote (INTERNAL):
- **Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.**

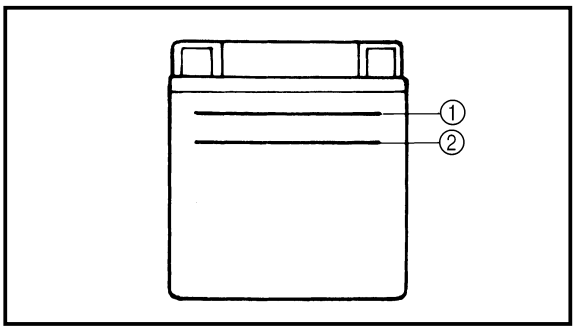
Batteries generate explosive, hydrogen gas. Always follow these preventive measures:
- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).**
- **DO NOT SMOKE when charging or handling batteries.**

KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.

CAUTION:
- **Do not place the battery on its side.**
- **Before adding electrolyte or recharging, be sure to remove the battery from the battery box.**
- **Make sure that the battery breather hose is properly connected and is not pinched or damaged.**

1. Remove:
   - Battery

⚠ WARNING
- **When removing the battery, disconnect the negative lead first.**
- **Remove the battery to prevent acid loss during the impeller service.**



2. Inspect:
   - Electrolyte level
     Low → Add distilled water.
     The electrolyte level should be between the upper ① and lower ② level marks.

Filling steps:
- Remove each filler cap.
- Add distilled water.
- When the electrolyte level reaches the upper level mark, allow the cell to stand for 20 minutes. If the electrolyte level drops, add more distilled water so the level reaches the upper level mark.

CAUTION:

Use only distilled water. Other types of water contain minerals which are harmful to batteries.

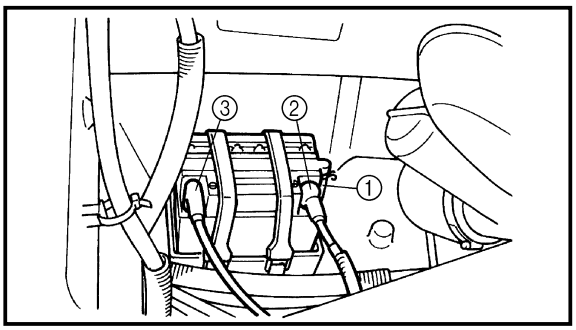
3. Inspect:
   - Specific gravity
     Out of specification → Charge.

Specific gravity at 20 °C (68 °F):
1.28
Charging current:
1.9 amps × 10 hrs (68.4 kC.)

4. Install:
   - Filler caps

CAUTION:

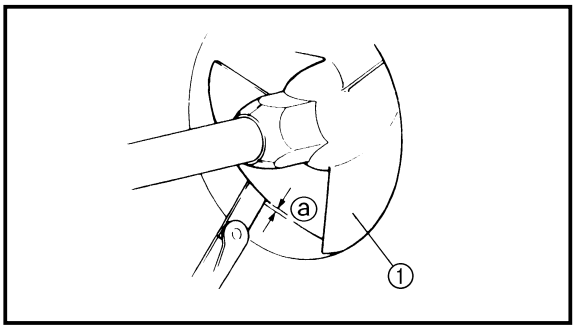
Before installation, rinse off any fluid from the battery box and battery and make sure that the battery is dry before installing it.

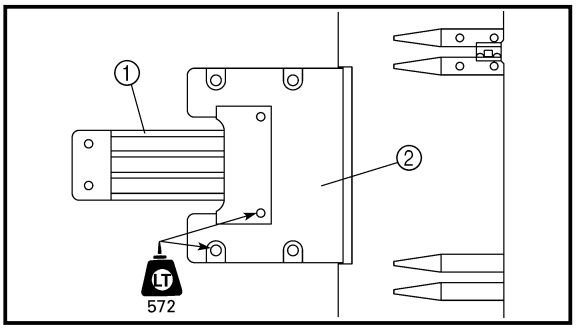


5. Install:
   - Battery breather hose ①
   - Battery
   - Positive lead ②
   - Negative lead ③
   - Battery band

CAUTION:

- **Connect the positive lead to the battery terminal first.**
- **Make sure the battery leads are connected properly. Reversing the leads can seriously damage the electrical system.**
- **Make sure that the battery breather hose is properly connected and is not obstructed.**
- **Coat the terminals with a water resistant grease to minimize terminal corrosion.**





JET PUMP UNIT

Impeller inspection

1. Check:
   - Impeller ①
     Damage/wear → Replace.
     Nicks/scratches → File or grind.
2. Measure:
   - Impeller-to-housing clearance ⓐ
     Out of specification → Replace.

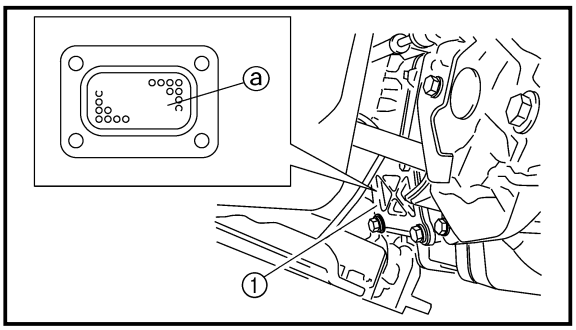
Max. impeller-to-housing clearance:
0.9 mm (0.035 in)

Measurement steps:

- Remove the battery leads.
- Remove the intake screen ① and duct ②.
- Measure the clearance at each impeller blade as shown (a total of four measurements).
- Install the intake screen.

Bolt:
M6: 8 Nm (0.8 m • kg, 5.8 ft • lb)
M8: 17 Nm (1.7 m • kg, 12 ft • lb)

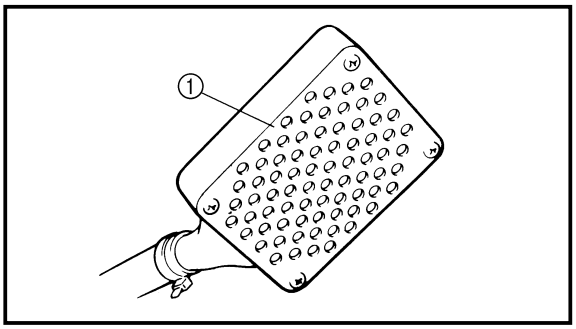
- Install the battery leads.



Water inlet filter inspection

1. Inspect:
   - Water inlet filter
     Contaminants → Clean.
     Cracks/damage → Replace.

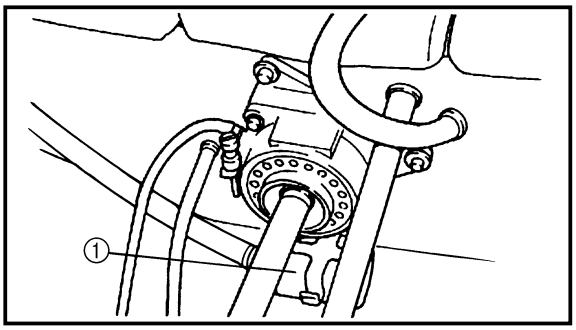
Inspection steps:
- Remove the water inlet cover ①.
- Inspect the water inlet filter mesh ⓐ.
- Reinstall the removed parts.

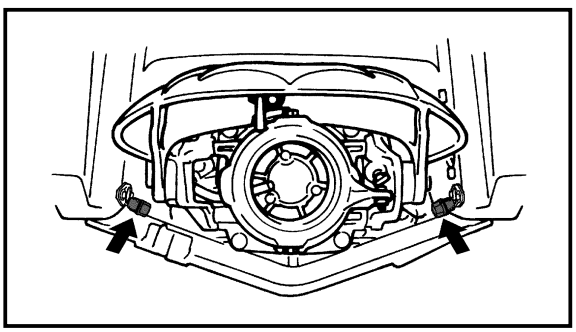


Bilge strainer inspection

1. Inspect:
   - Bilge strainer
     Contaminants → Clean.
     Cracks/damage → Replace.

Inspection steps:
- Remove the coupling cover.
- Disconnect the bilge strainer ① from the bilge strainer holder.
- Inspect the bilge strainer.

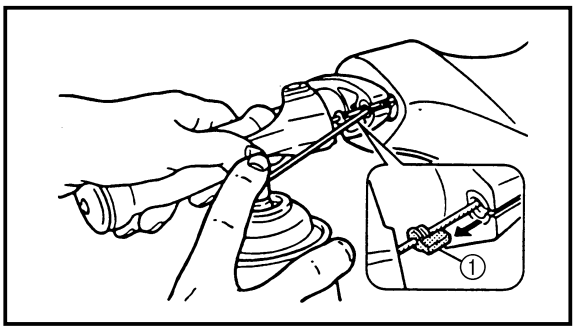


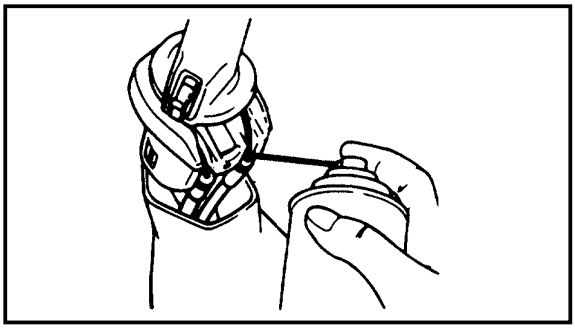


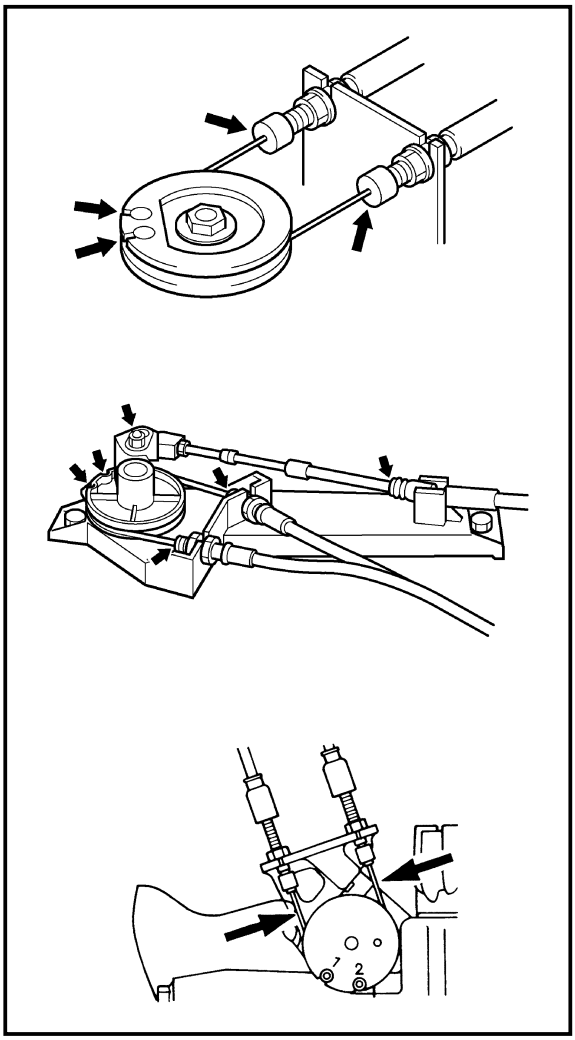
GENERAL

Drain plug inspection

1. Inspect:
   - Drain plug
     Cracks/damage → Replace.
   - O-ring
     Cracks/wear → Replace.
   - Screw threads
     Contaminants → Clean.







Lubrication points

1. Lubricate:
   - Throttle cable (handlebar side)
   - QSTS control cables (handlebar side)

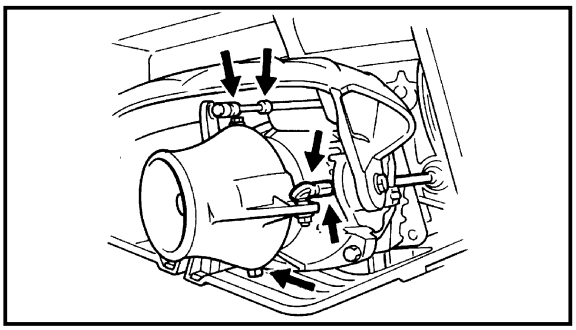
Recommended lubricant:
Rust inhibitor

NOTE:

- Before lubricating the throttle cable, squeeze the throttle lever and remove the rubber seal ①.
- Before lubricating the QSTS control cables, remove the trim grip guide.

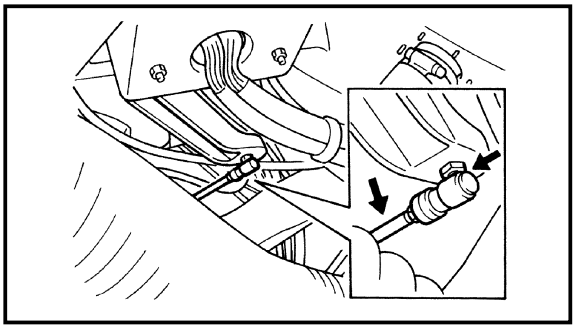
2. Lubricate:
   - Throttle cable (carburetor side)
   - Oil pump cable
   - QSTS cables (pulley side)
   - YPVS cables

Recommended grease:
Yamaha marine grease,
Yamaha grease A
(Water resistant grease)



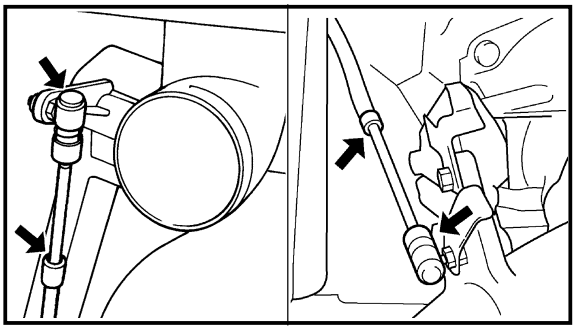
3. Lubricate:
   - Nozzle pivot shaft
   - Steering cable (nozzle side)
   - QSTS cable (nozzle side)

Recommended grease:
Yamaha marine grease,
Yamaha grease A
(Water resistant grease)

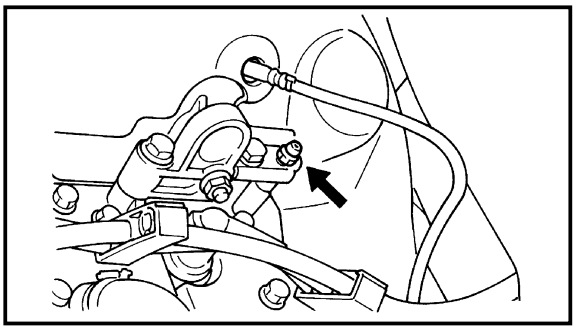


4. Lubricate:
   - Steering cable
   - Steering cable joint
   - Shift cable
   - Shift cable joint

NOTE:
Disconnect the joints and apply a small amount of grease.



Recommended grease:
Yamaha marine grease,
Yamaha grease A
(Water resistant grease)



5. Fill:
   - Bearing housing

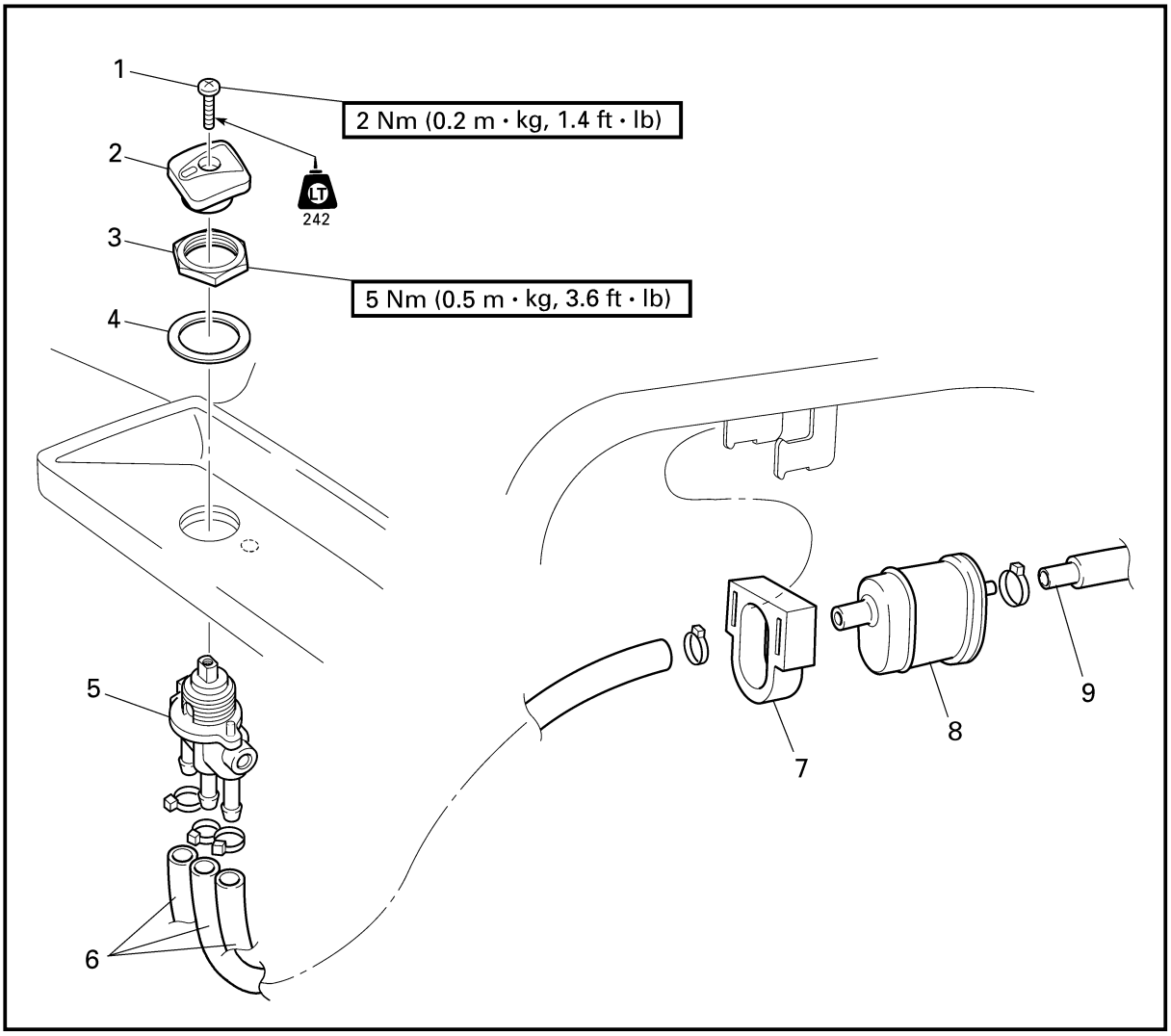
Recommended grease:
Yamaha marine grease,
Yamaha grease A
(Water resistant grease)

NOTE:
- Fill the bearing housing with water resistant grease through the grease nipples.
- Add the grease slowly and carefully or it could damage the hose and the joints.
  Refer to "MAINTENANCE INTERVAL CHART".

CHAPTER 4
FUEL SYSTEM

FUEL COCK AND FUEL FILTER

EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	FUEL COCK AND FUEL FILTER REMOVAL		Follow the left "Step" for removal.
1	Screw	1	
2	Knob	1	
3	Nut	1	
4	Washer	1	
5	Fuel cock assembly	1	
6	Fuel hose	3	
7	Holder	1	
8	Fuel filter	1	
9	Fuel hose	1	
			Reverse the removal steps for installation.

SERVICE POINTS

Fuel filter inspection

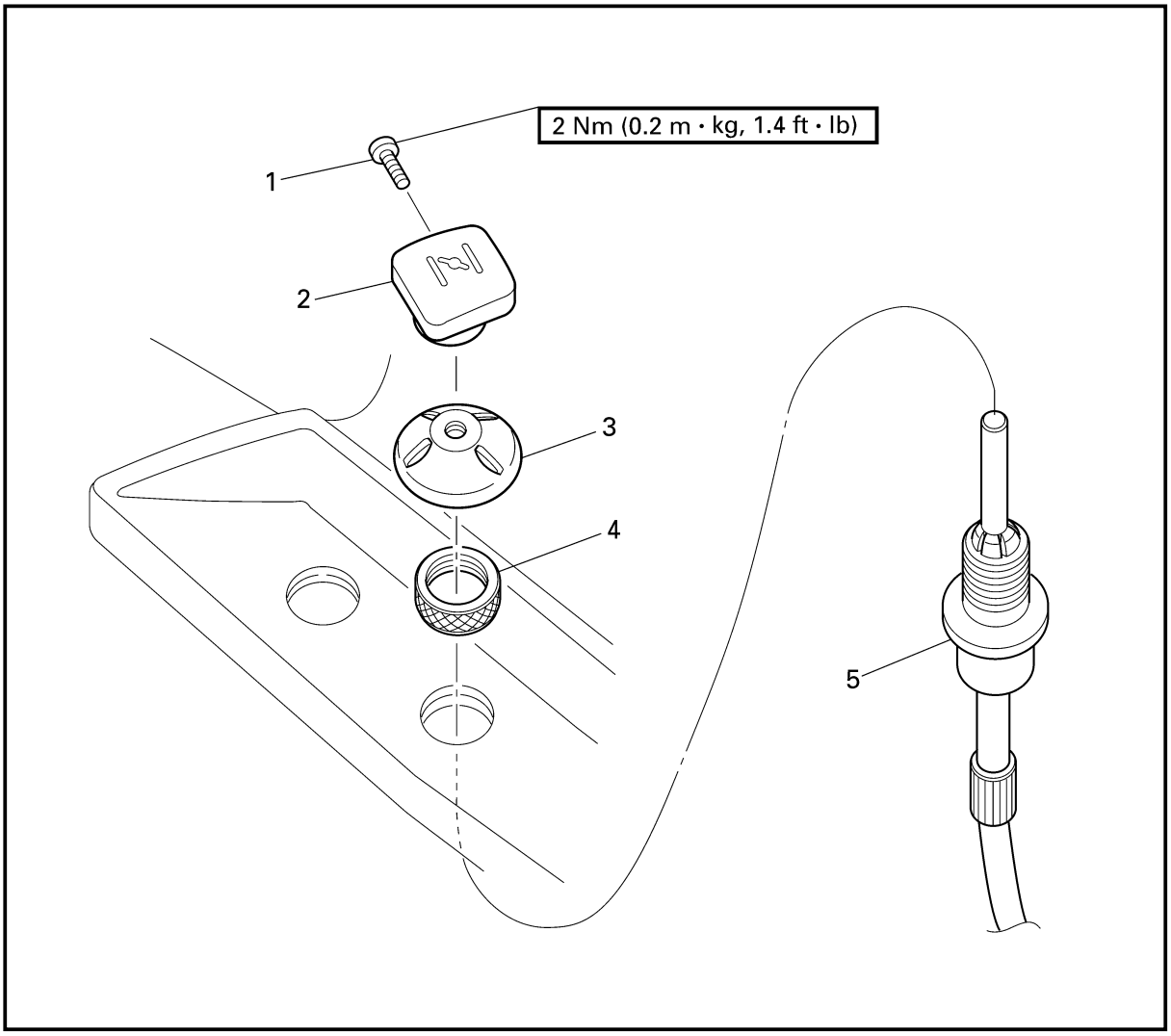
Refer to “FUEL SYSTEM” in chapter 3.

Fuel cock inspection

1. Check:
   - Fuel cock
     Contaminants → Clean.
     Rough movement → Replace.

CHOKE CABLE

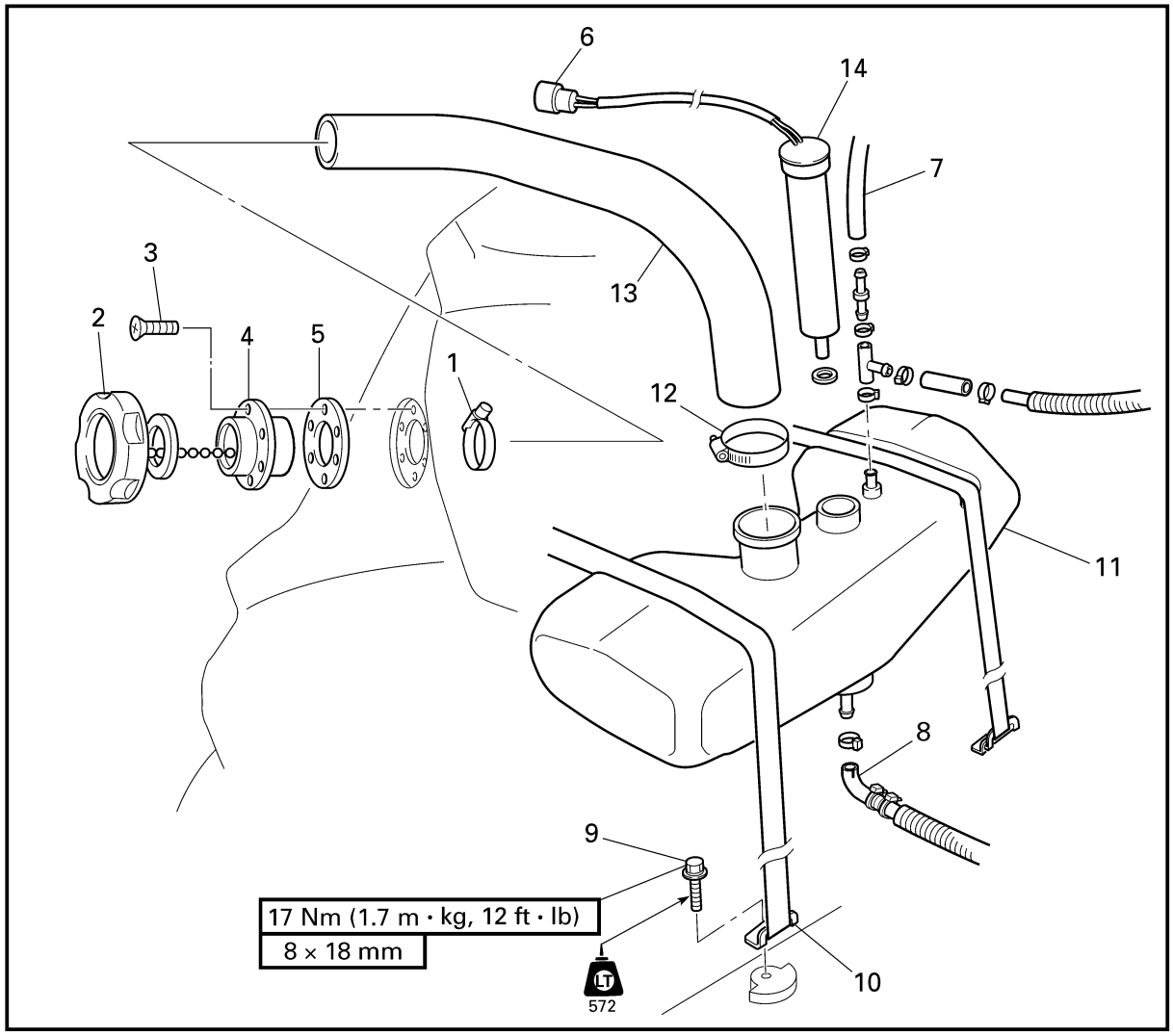
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CHOKE CABLE REMOVAL		Follow the left "Step" for removal.
1	Screw	1	
2	Knob	1	
3	Friction adjusting nut	1	
4	Nut	1	
5	Choke cable	1	
			Reverse the removal steps for installation.

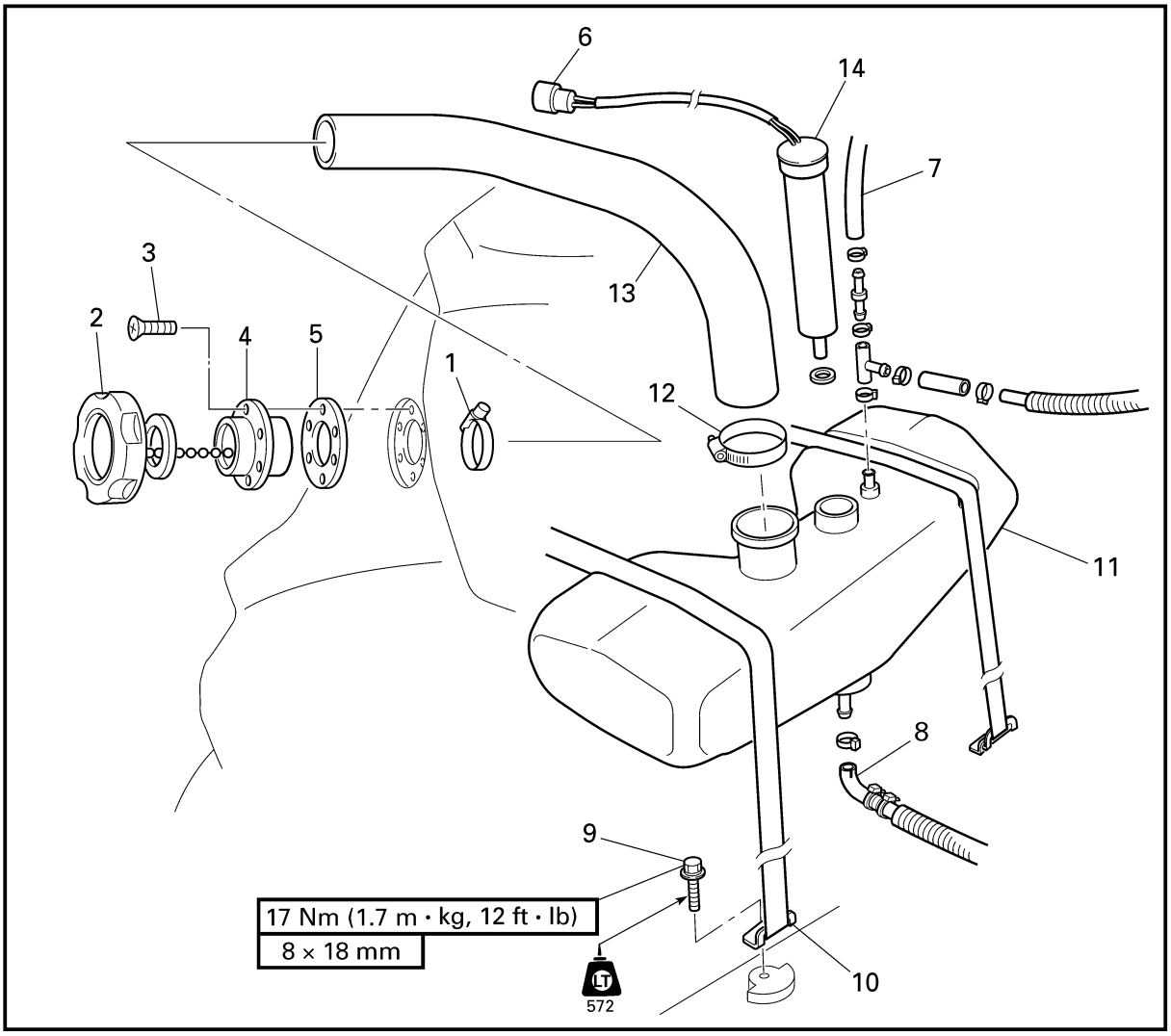
OIL TANK
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	OIL TANK REMOVAL		Follow the left "Step" for removal.
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY" in chapter 5.
	Intake duct		Refer to "INTAKE DUCT AND SILENCER".
1	Hose clamp	1	
2	Oil filler cap	1	
3	Screw	6	
4	Oil filler neck	1	
5	Rubber seal	1	
6	Oil level sensor coupler	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Breather hose	1	
8	Oil hose	1	
9	Bolt	2	
10	Tank belt	2	
11	Oil tank assembly	1	
12	Hose clamp	1	
13	Oil filler hose	1	
14	Oil level sensor	1	
			Reverse the removal steps for installation.

SERVICE POINTS

Oil filter inspection

Refer to "OIL INJECTION SYSTEM" in chapter 3.

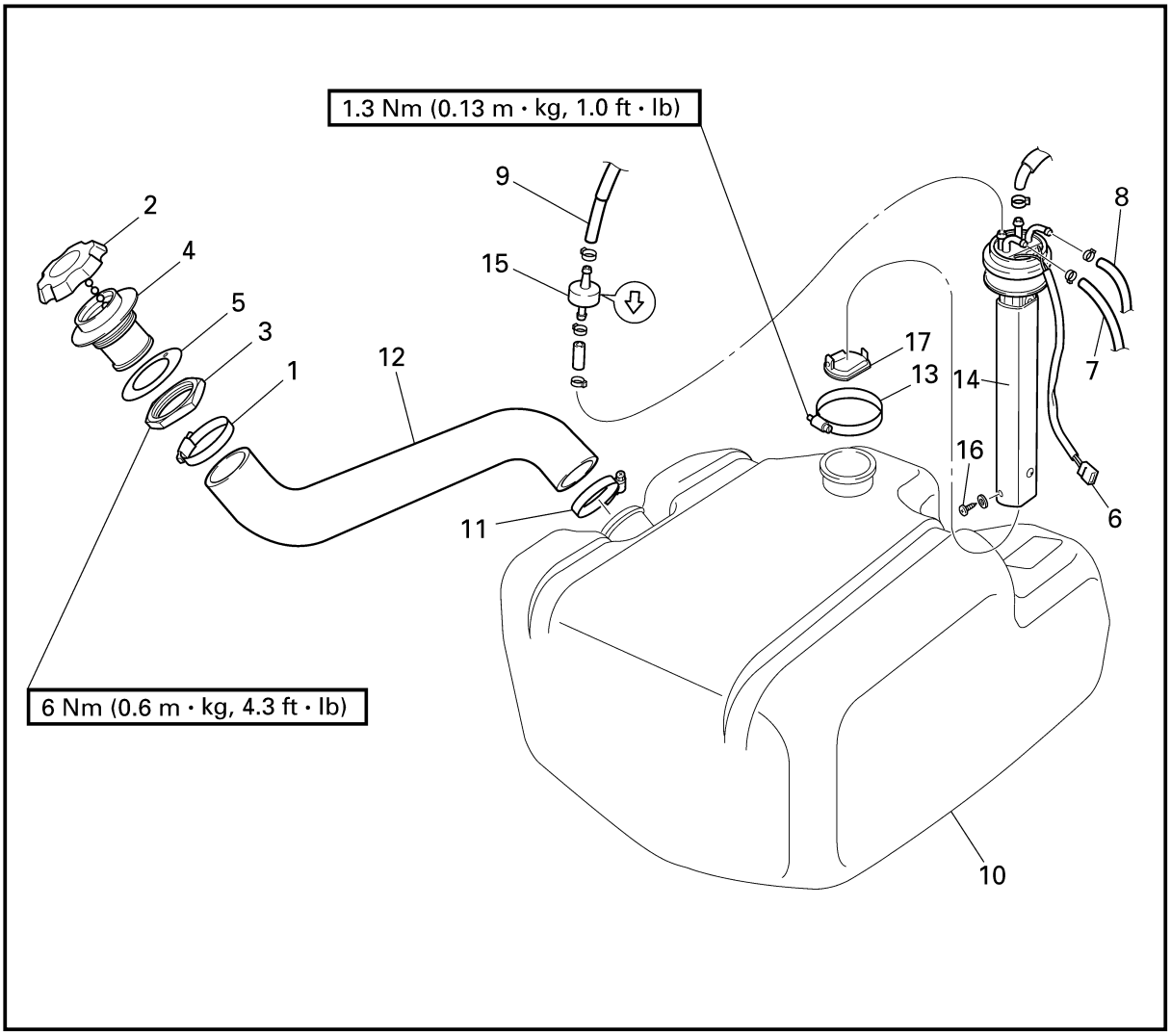
Oil level switch inspection

Refer to "INDICATION SYSTEM" in chapter 7.

Oil tank inspection

1. Inspect:
   - Oil tank
     Cracks/damage → Replace.

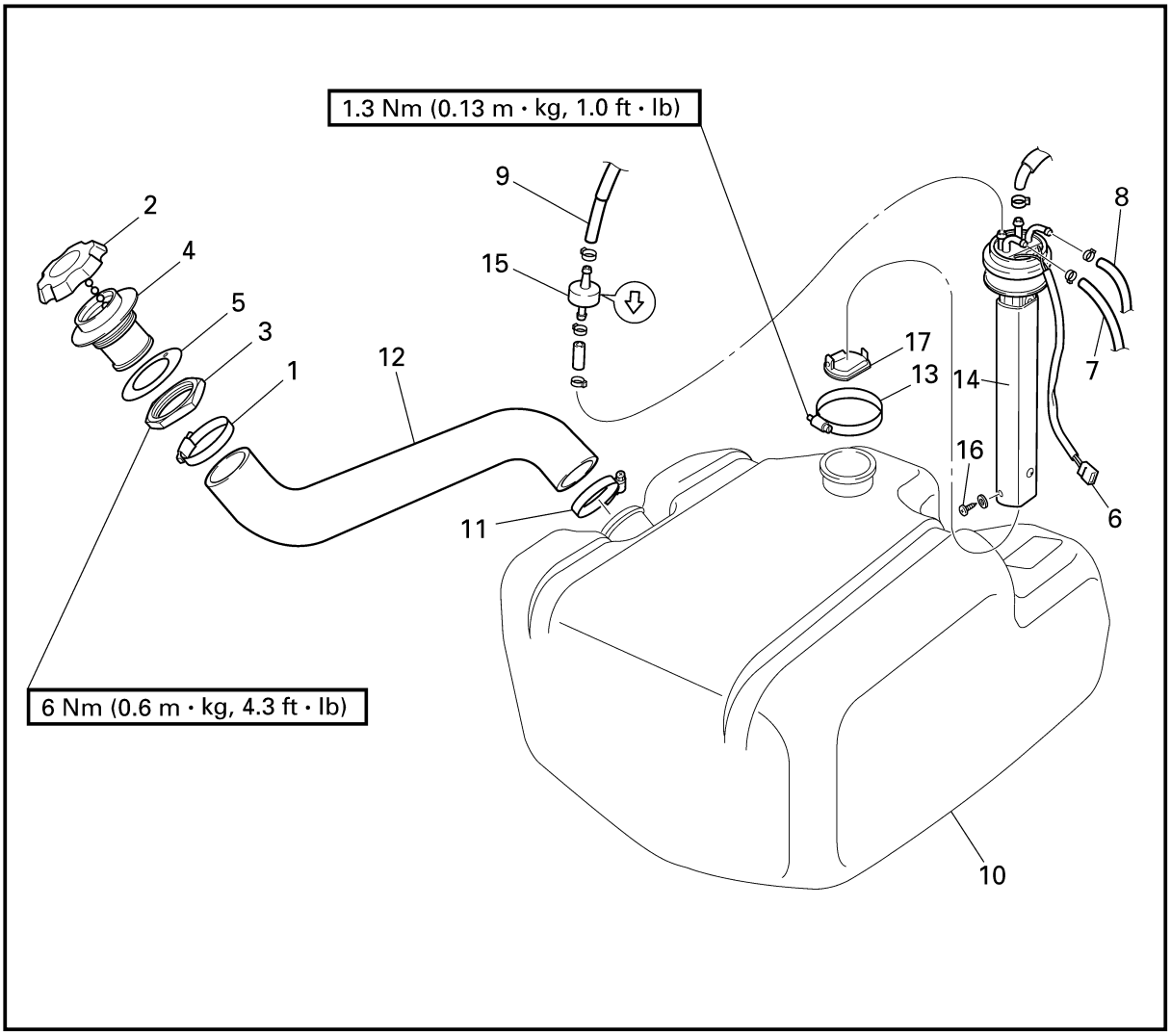
FUEL TANK
EXPLODED DIAGRAM



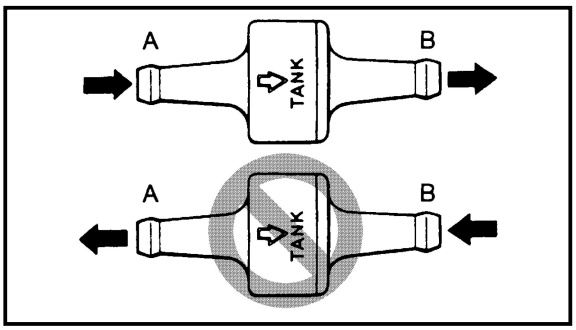
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	FUEL TANK REMOVAL		Follow the left "Step" for removal.
	Engine unit		Refer to "ENGINE UNIT" in chapter 5.
	Oil tank		Refer to "OIL TANK".
1	Hose clamp	1	
2	Fuel filler cap	1	
3	Nut	1	
4	Fuel filler neck	1	
5	Rubber seal	1	
6	Fuel level sensor coupler	1	
7	Fuel reserve hose	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
8	Fuel hose	1	
9	Fuel breather hose	1	
10	Fuel tank assembly	1	
11	Hose clamp	1	
12	Fuel filler hose	1	
13	Hose clamp	1	
14	Fuel sensor assembly	1	
15	One way valve	1	
16	Screw	1	
17	Filter	1	
			Reverse the removal steps for installation.



SERVICE POINTS

Check valve inspection

1. Check:
   - Check valve
     Faulty → Replace.

Checking steps:
- Connect a hose to the end of check valve "A" and blow into it.
  Air should come out from end "B".
- Connect the hose to the end of check valve "B" and blow into it.
  Air should not come out from end "A".

Fuel level switch inspection

Refer to "INDICATION SYSTEM" in chapter 7.

Fuel tank inspection

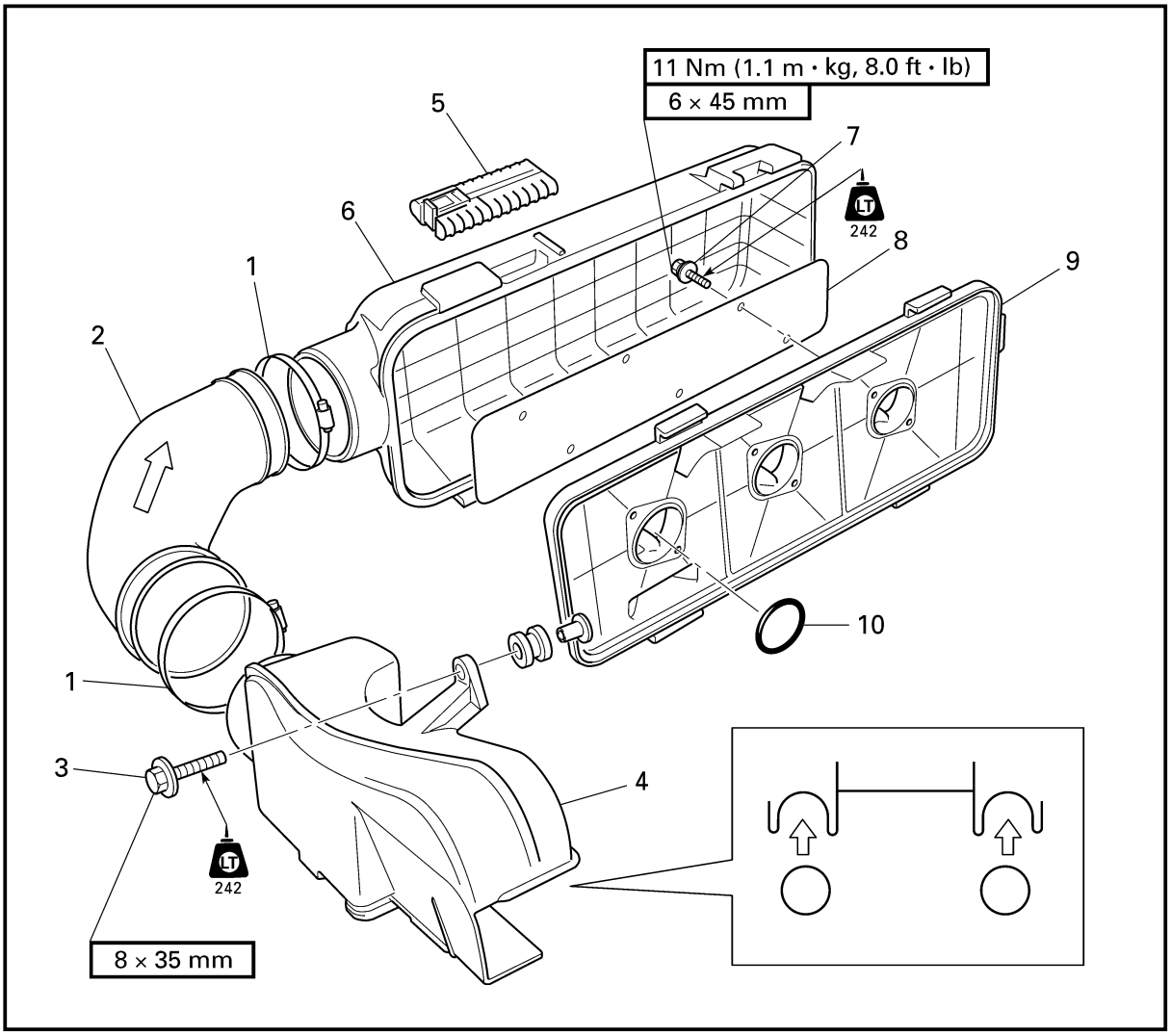
1. Inspect:
   - Fuel tank
     Cracks/damage → Replace.

Pipe joint inspection

1. Inspect:
   - Pipe
     Contaminants → Clean.
     Bends/damage → Replace.

INTAKE DUCT AND SILENCER

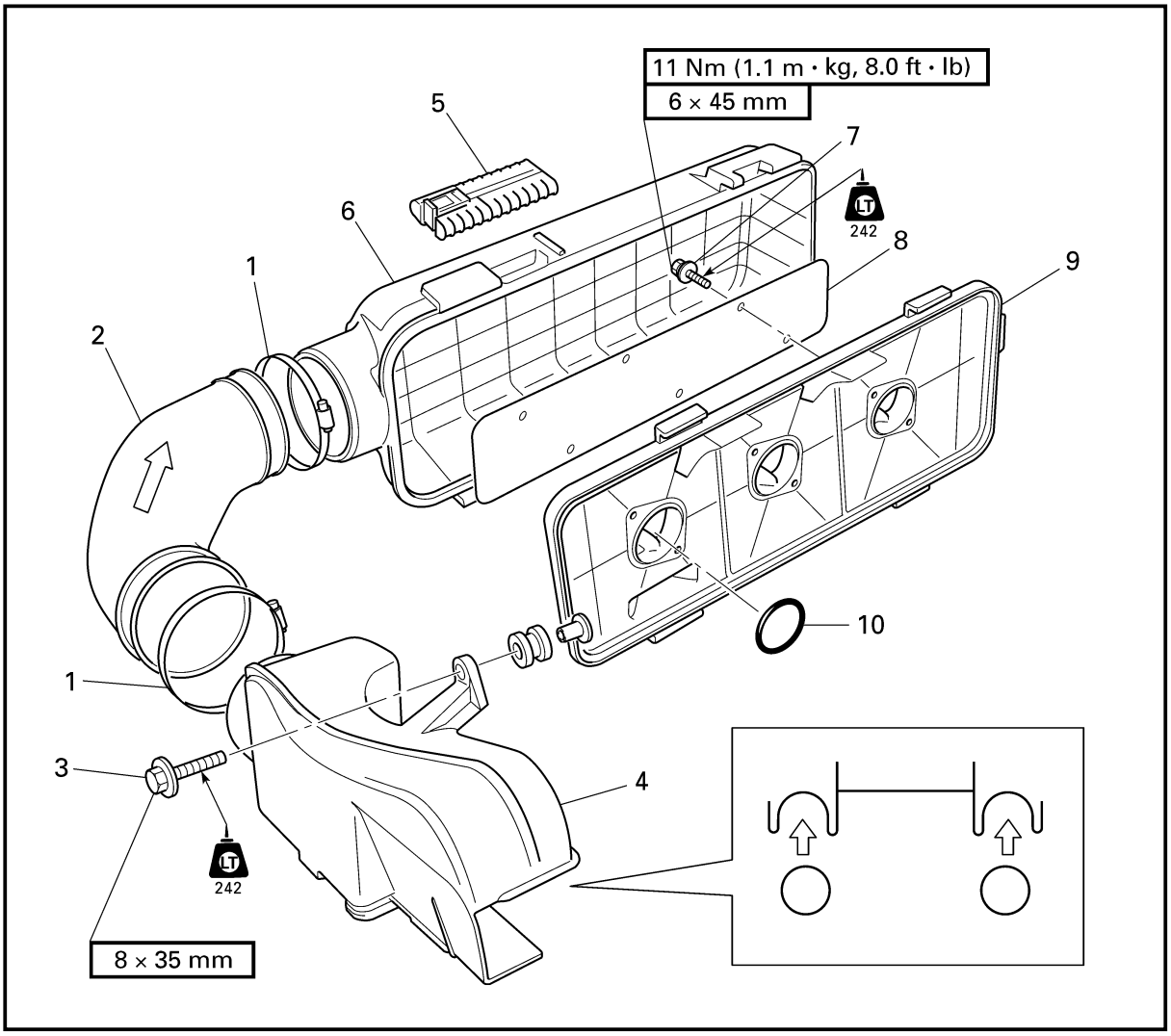
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

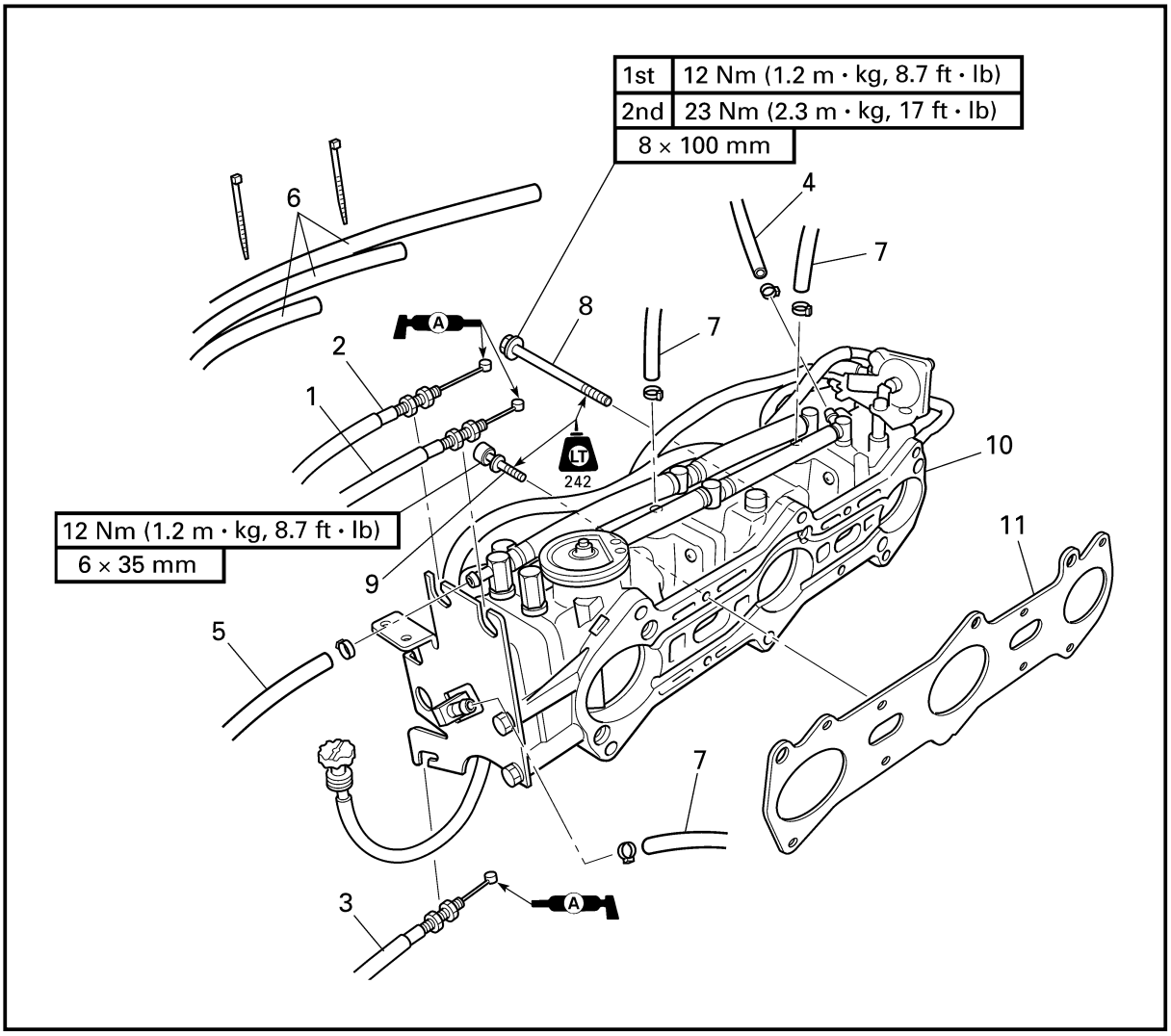
Step	Procedure/Part name	Q'ty	Service points
	INTAKE DUCT AND SILENCER REMOVAL		Follow the left "Step" for removal.
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY" in chapter 5.
	Muffler assembly		Refer to "MUFFLER ASSEMBLY" in chapter 5.
1	Hose clamp	2	
2	Joint hose	1	
3	Bolt	1	
4	Intake duct	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
5	Hook	5	
6	Silencer case	1	
7	Bolt	6	
8	Filter	1	
9	Silencer plate	1	
10	O-ring	3	
			Reverse the removal steps for installation.

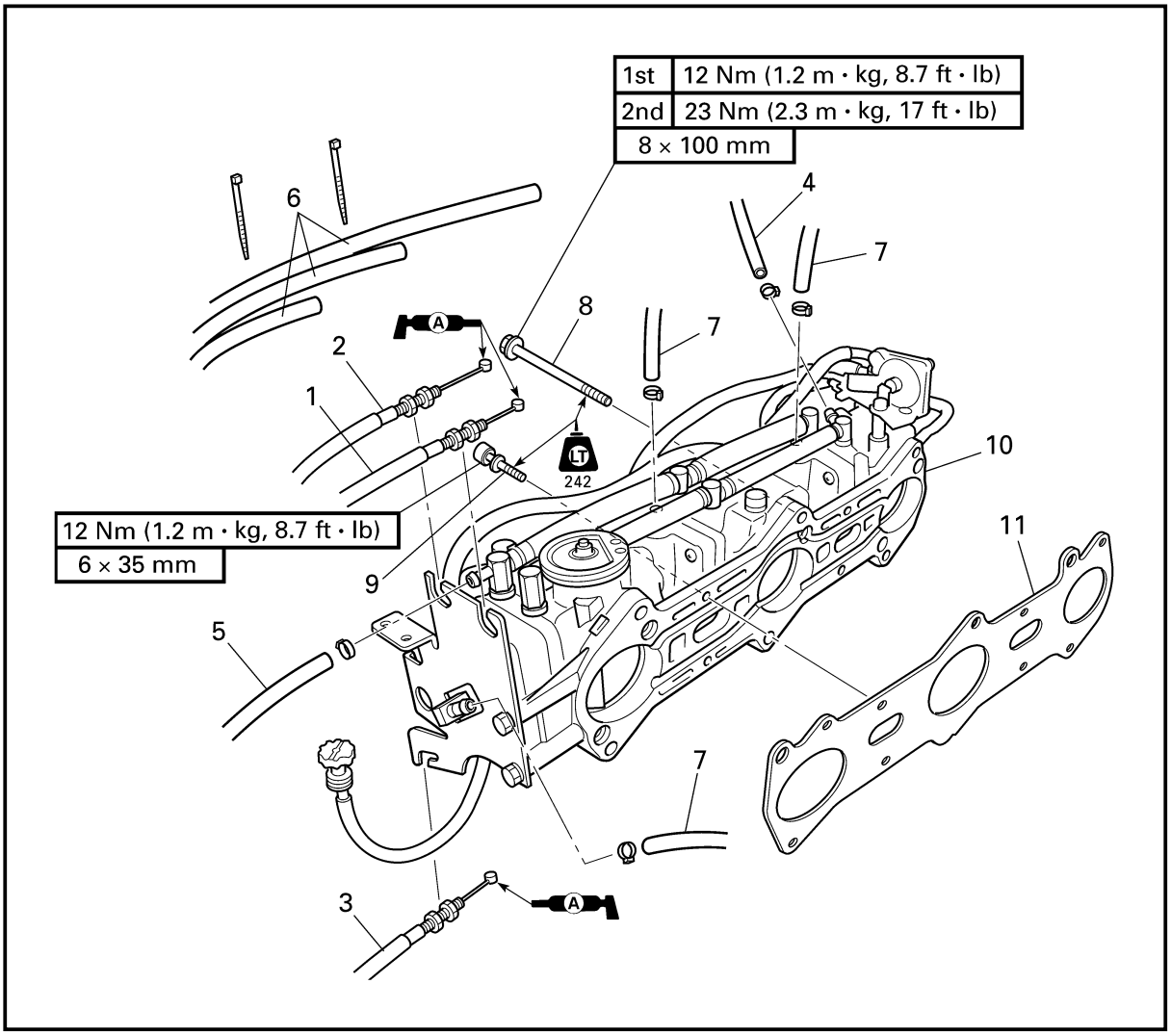
CARBURETOR UNIT
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

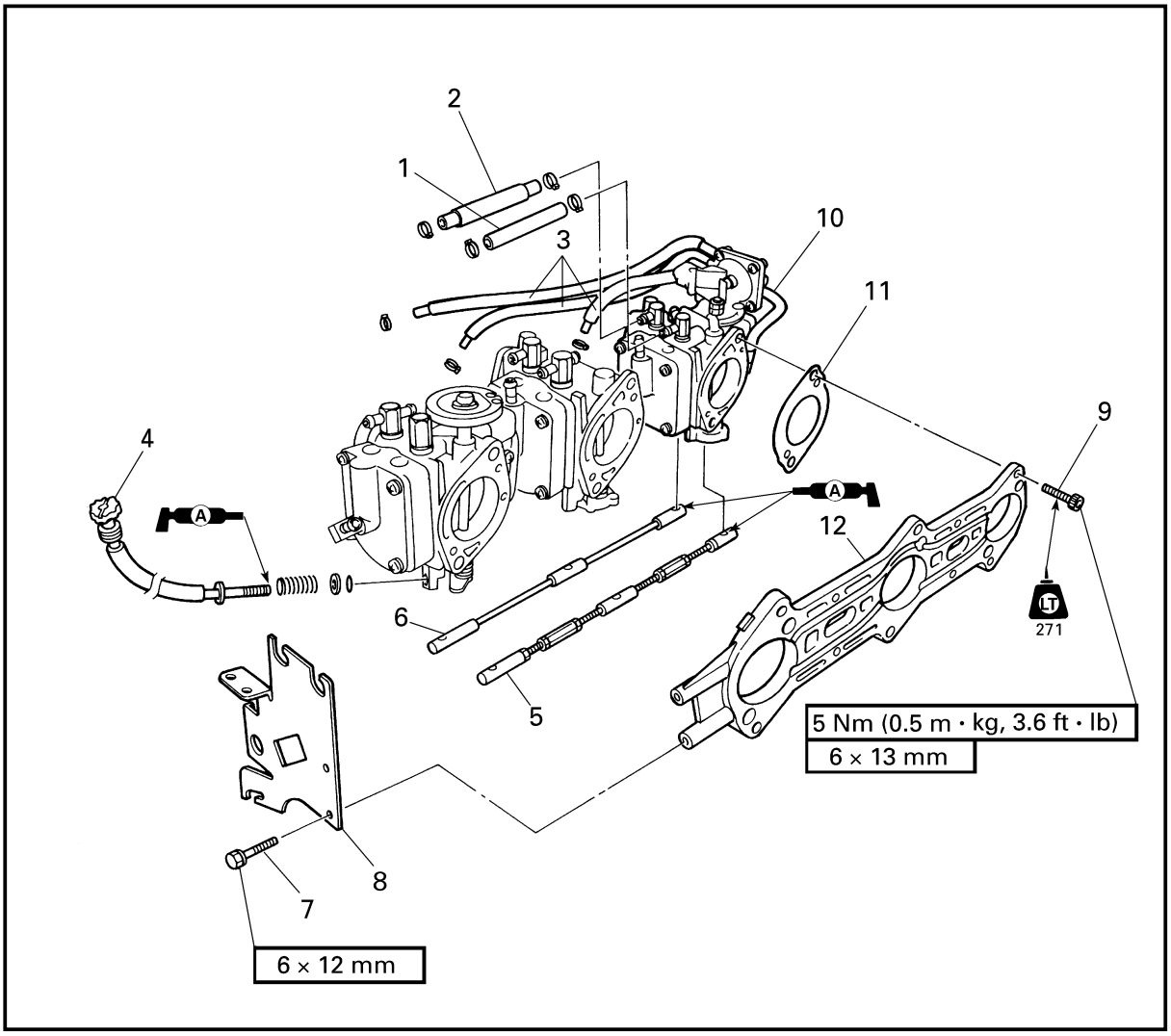
Step	Procedure/Part name	Q'ty	Service points
	CARBURETOR UNIT REMOVAL		Follow the left "Step" for removal.
	Silencer		Refer to "INTAKE DUCT AND SILENCER".
1	Oil pump cable	1	
2	Throttle cable	1	
3	Choke cable	1	
4	Fuel delivery hose	1	
5	Fuel return hose	1	
6	Oil delivery hose	3	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Fuel pump vacuum hose	3	
8	Bolt	6	
9	Bolt	4	
10	Carburetor assembly	1	
11	Gasket	1	**Not reusable** Reverse the removal steps for installation.

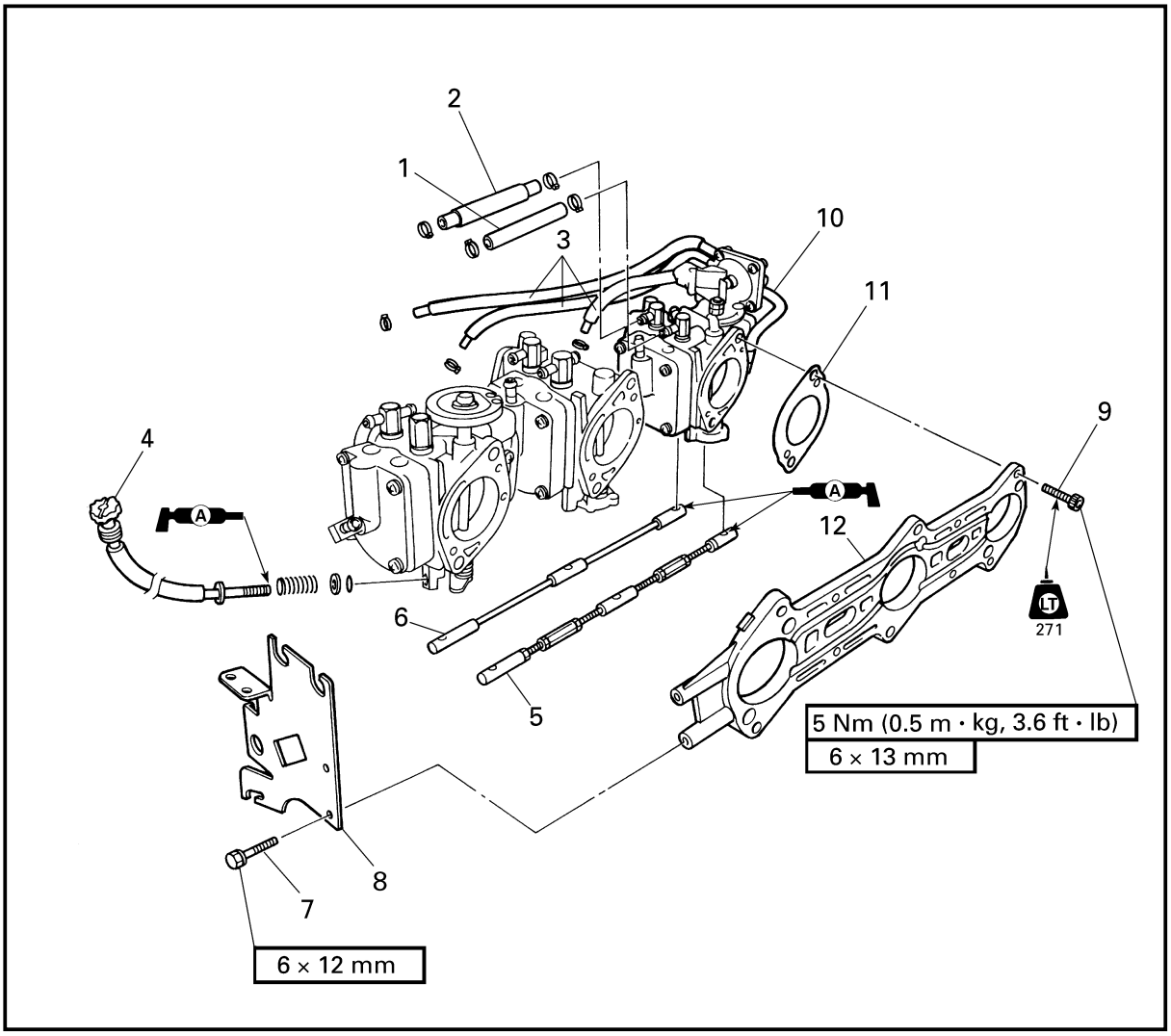
EXPLODED DIAGRAM



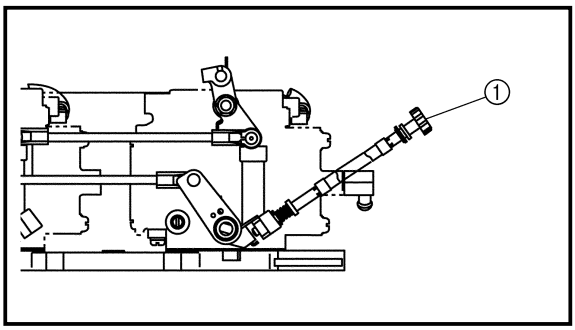
REMOVAL AND INSTALLATION CHART

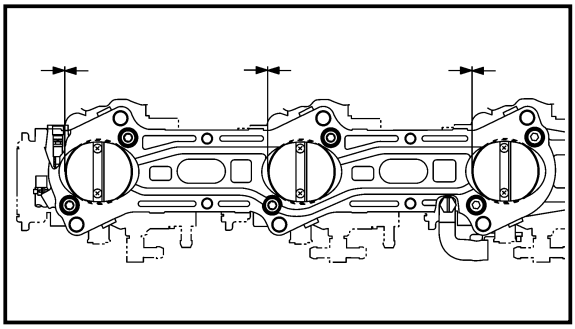
Step	Procedure/Part name	Q'ty	Service points
	CARBURETOR UNIT SEPARATION		Follow the left "Step" for removal.
1	Hose	2	
2	Hose	2	
3	Accelerator pump hose	3	
4	Remote throttle stop screw assembly	1	
5	Throttle link	1	
6	Choke link	1	

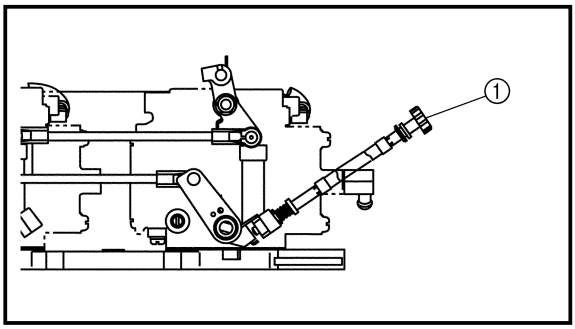
EXPLODED DIAGRAM

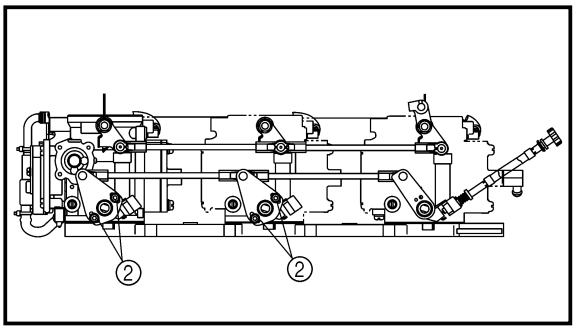


Step	Procedure/Part name	Q'ty	Service points
7	Bolt	3	
8	Cable holder	1	
9	Bolt	6	
10	Carburetor	3	
11	Gasket	3	**Not reusable**
12	Plate	1	
			Reverse the removal steps for installation.









SERVICE POINTS

Throttle valve synchronization inspection and adjustment

1. Check:
   - Throttle valve synchronization
     Different clearances → Adjust.

Checking steps:
- Loosen the remote throttle stop screw ① until untouched the screw end from the throttle lever.
- Check the each throttle valve is fully closed.

2. Adjust:
   - Throttle valve synchronization

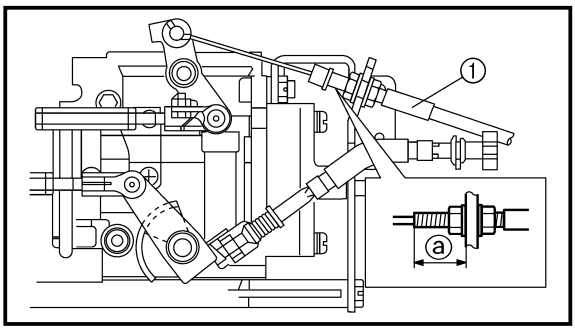
Adjustment steps:
- Loosen the remote throttle stop screw ① until untouched the screw end from the throttle lever.
- Loosen the screws ②.

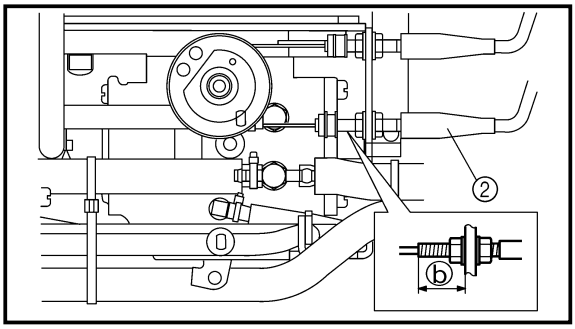
NOTE:
Make sure that the throttle valves are in the fully closed position.

- Tighten the screws ②.

Screw:
2 Nm (0.2 m • kg, 1.4 ft • lb)

- Turn in the remote throttle stop screw to the original position.





Choke cable and throttle cable installation

1. Install:
   - Choke cable ①
   - Throttle cable ②

Choke cable guide installation position ⓐ:
13 ~ 15 mm (0.51 ~ 0.59 in)
Throttle cable guide installation position ⓑ:
18 ~ 20 mm (0.71 ~ 0.79 in)

2. Adjust:
   - Throttle lever free play
     Refer to "CONTROL SYSTEM" in chapter 3.

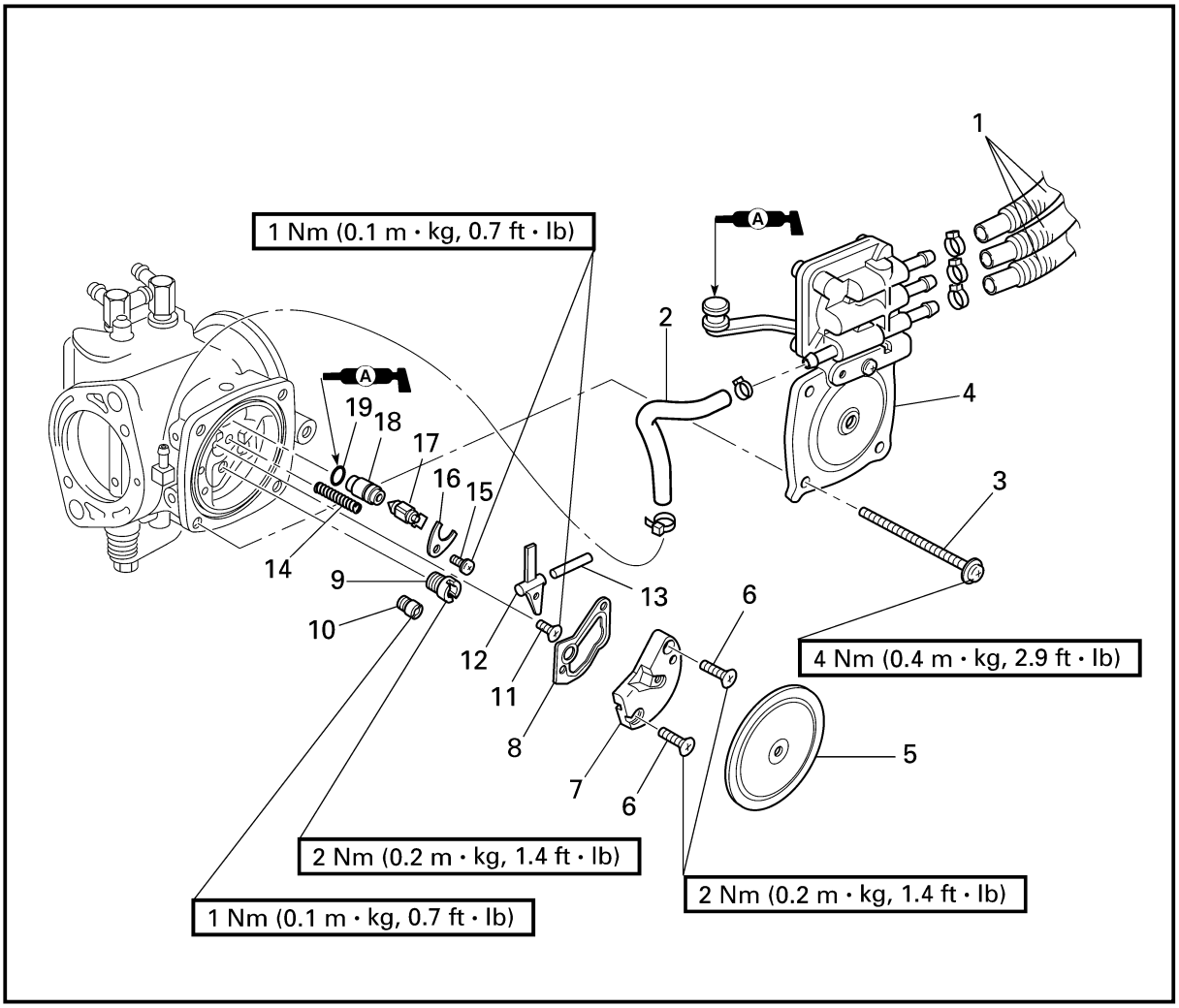
Oil pump cable installation

1. Adjust:
   - Oil pump cable
     Refer to "OIL PUMP".

Carburetor assembly

1. Adjust:
   - Trolling speed
     Refer to "FUEL SYSTEM" in chapter 3.

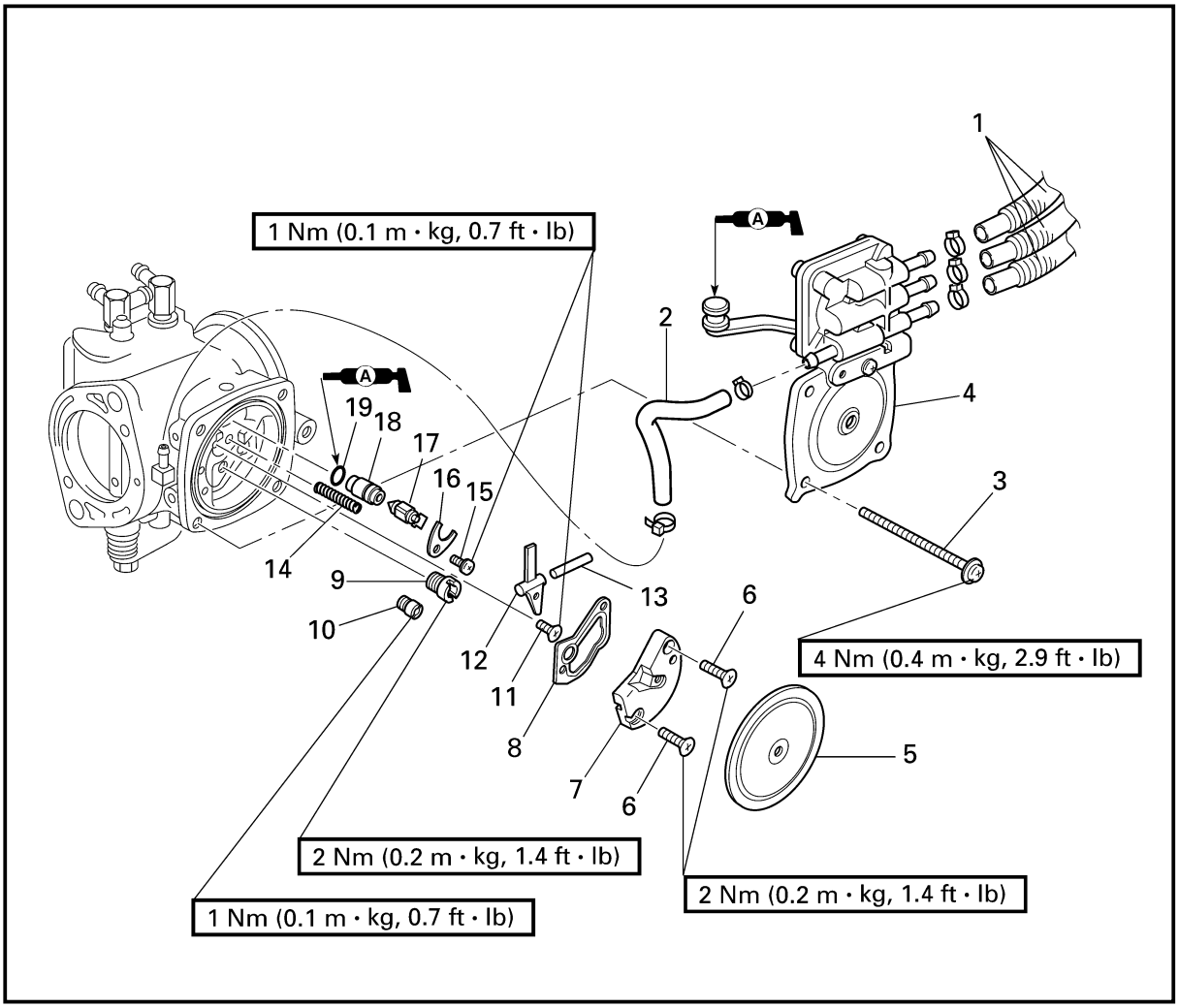
CARBURETOR
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

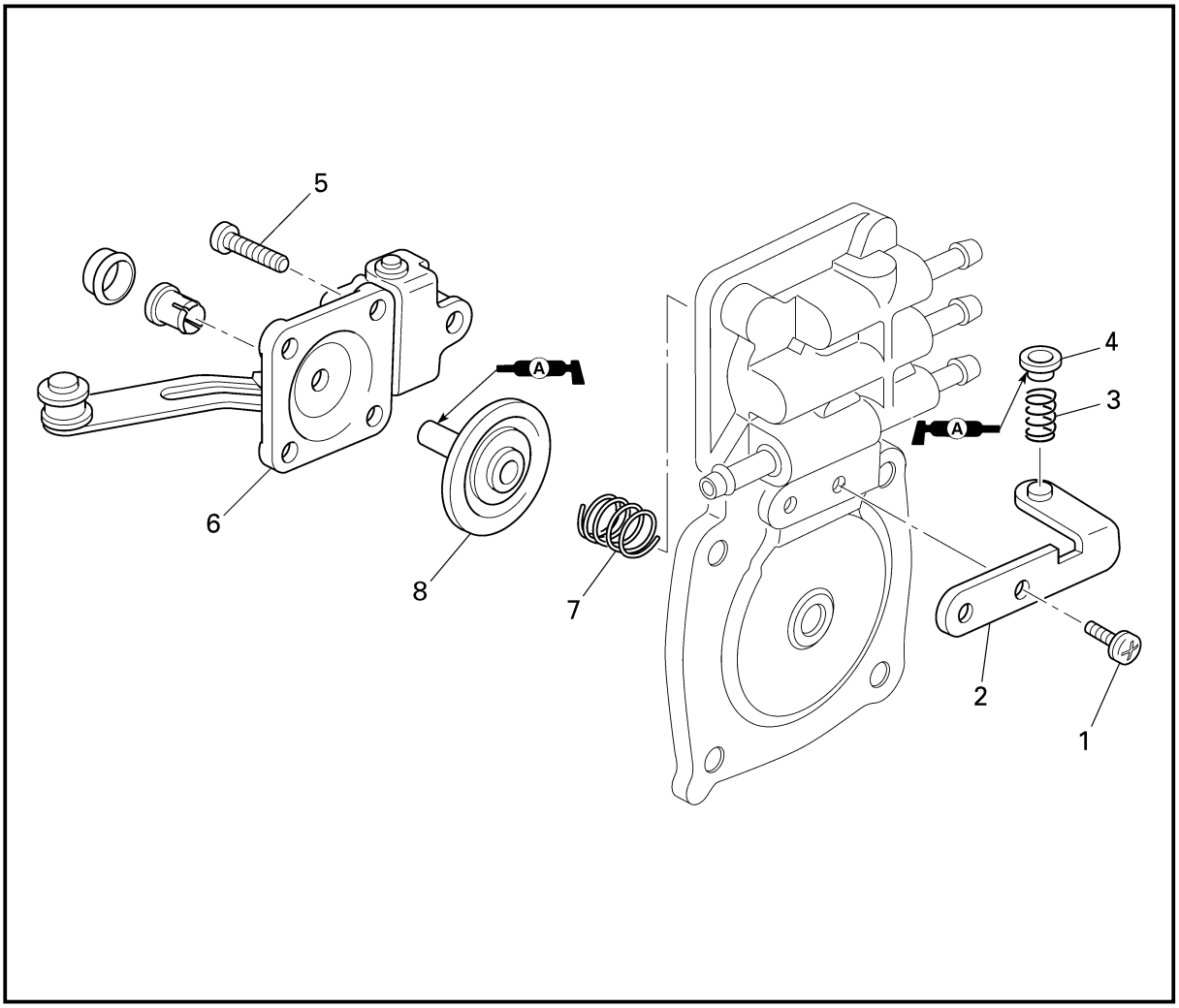
Step	Procedure/Part name	Q'ty	Service points
	CARBURETOR DISASSEMBLY		Follow the left "Step" for disassembly.
1	Accelerator pump delivery hose	3	Carburetor #3
2	Accelerator pump fuel hose	1	Carburetor #3
3	Screw	4	
4	Accelerator pump/carburetor cover	1/1	Carburetor #3/carburetor #1 and #2
5	Diaphragm	1	
6	Screw	2	
7	Regulator body	1	
8	Gasket	1	
9	Main jet	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
10	Pilot jet	1	
11	Screw	1	
12	Arm	1	
13	Arm pin	1	
14	Spring	1	
15	Screw	1	
16	Needle valve seat holder	1	
17	Needle valve	1	
18	Needle valve seat	1	
19	O-ring	1	
			Reverse the disassembly steps for assembly.

EXPLODED DIAGRAM



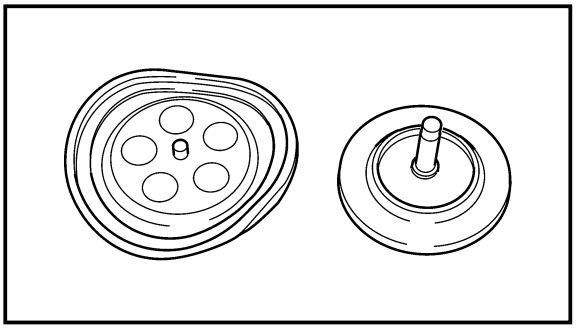
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	ACCELERATOR PUMP DISASSEMBLY		Follow the left "Step" for disassembly.
1	Screw	1	
2	Stay	1	
3	Spring	1	
4	Spring seat	1	
5	Screw	4	
6	Accelerator pump cover assembly	1	
7	Spring	1	
8	Diaphragm	1	
9	Accelerator pump body	1	
			Reverse the disassembly steps for assembly.

SERVICE POINTS

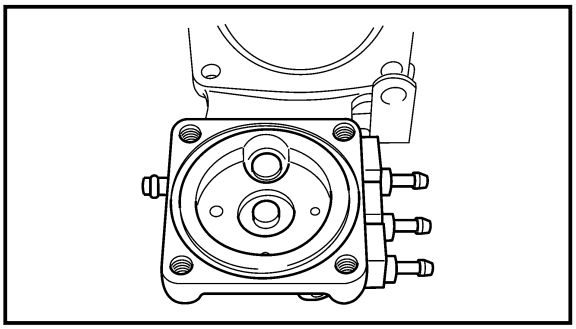
CAUTION:

Do not use steel wire for cleaning the jets. This may enlarge the jet diameters and seriously affect performance.



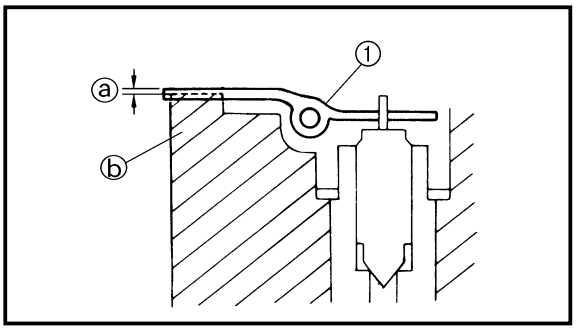
Diaphragm inspection

1. Inspect:
   - Diaphragm
     Damage → Replace.



Accelerator pump body inspection

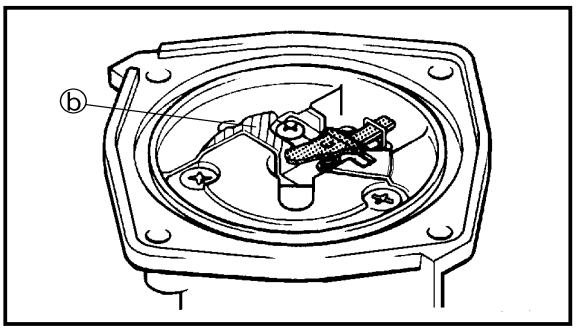
1. Inspect:
   - One way valve
     Crack/damage → Replace the accelerator pump body.
   - Fuel passage
     Clog → Clean or replace.



Arm inspection

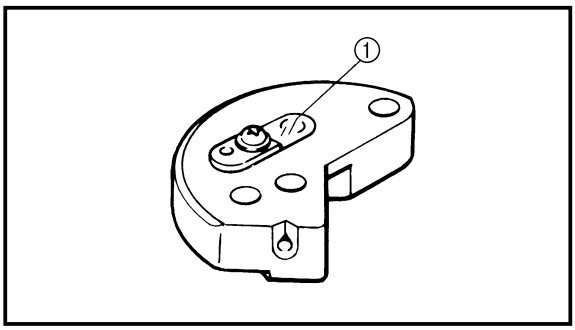
1. Inspect:
   - Arm ①
     Bends/damage → Repair or replace.
2. Measure:
   - Arm height ⓐ

Arm height:
0 ~ 0.2 mm (0 ~ 0.008 in)



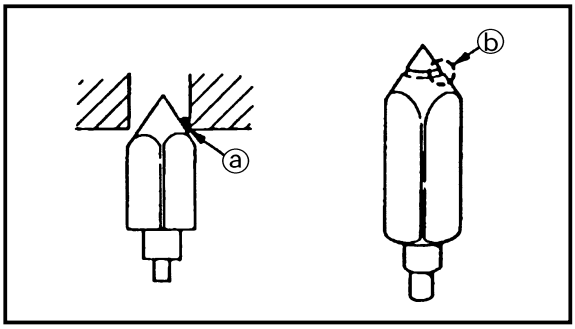
NOTE:

- Measure the distance between the surface of the carburetor body ⓑ and the top surface of the arm.
- The arm should be resting on the needle valve, but not compressing it.



Regulator body inspection

1. Inspect:
   - Regulator body
     Contaminants → Clean.
     Damage → Replace.
   - Valve (clear film) ①
     Damage → Replace.



Needle valve inspection

1. Inspect:
   - Needle valve
   - Needle valve seat
     Contaminants ⓐ → Clean.
     Wear ⓑ → Replace.

NOTE:

Always replace the needle valve and needle valve seat as a set.

Jet and carburetor body inspection

1. Inspect:
   - Main jet
   - Pilot jet
   - Carburetor body
     Clog/contaminants → Clean.
     Damage/wear → Replace.

CAUTION:

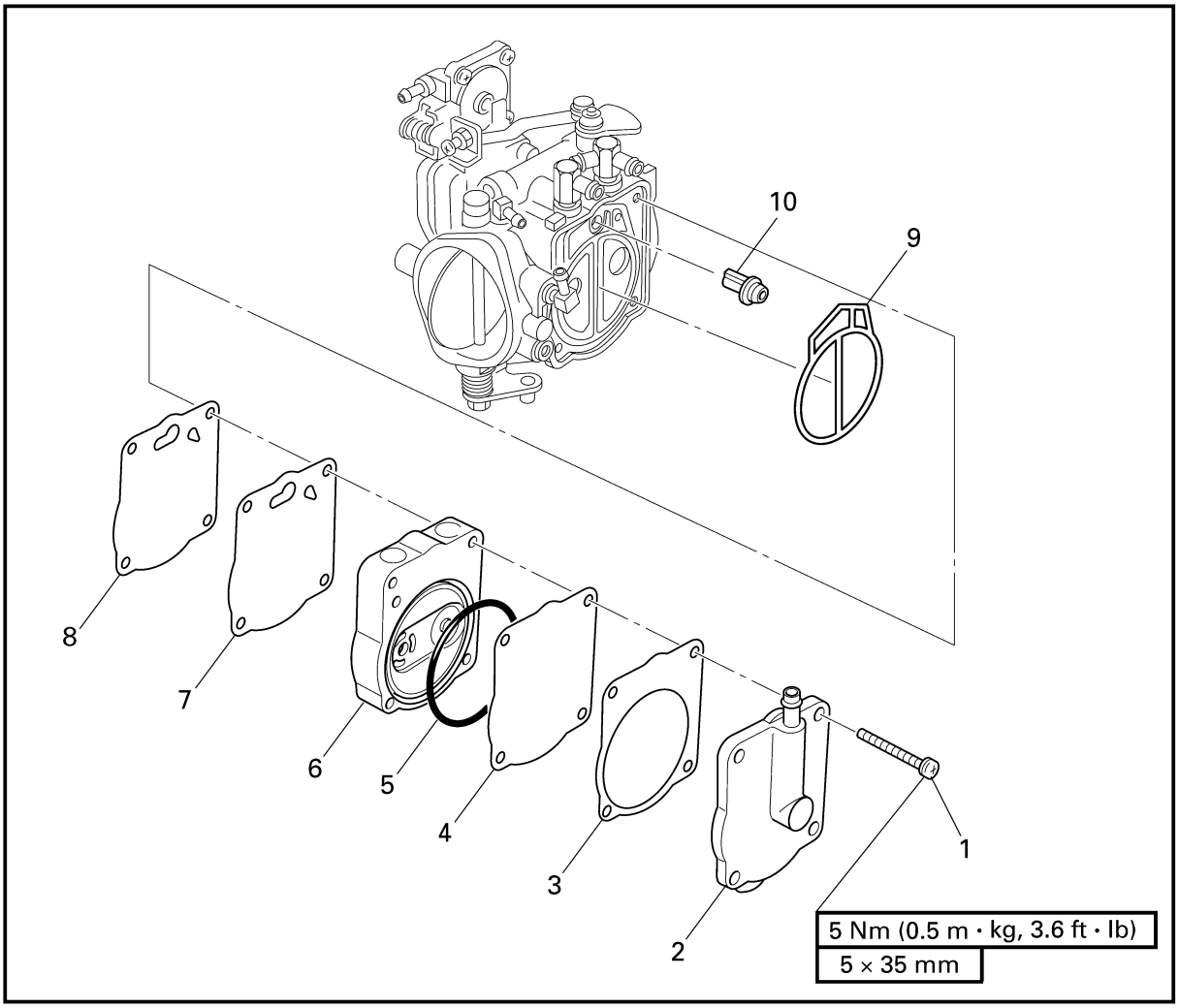
Do not use a steel wire to clean the jets. This may enlarge the jet diameters and seriously affect performance.

Carburetor assembly

1. Adjust:
   - Trolling speed
     Refer to "FUEL SYSTEM" in chapter 3.

FUEL PUMP

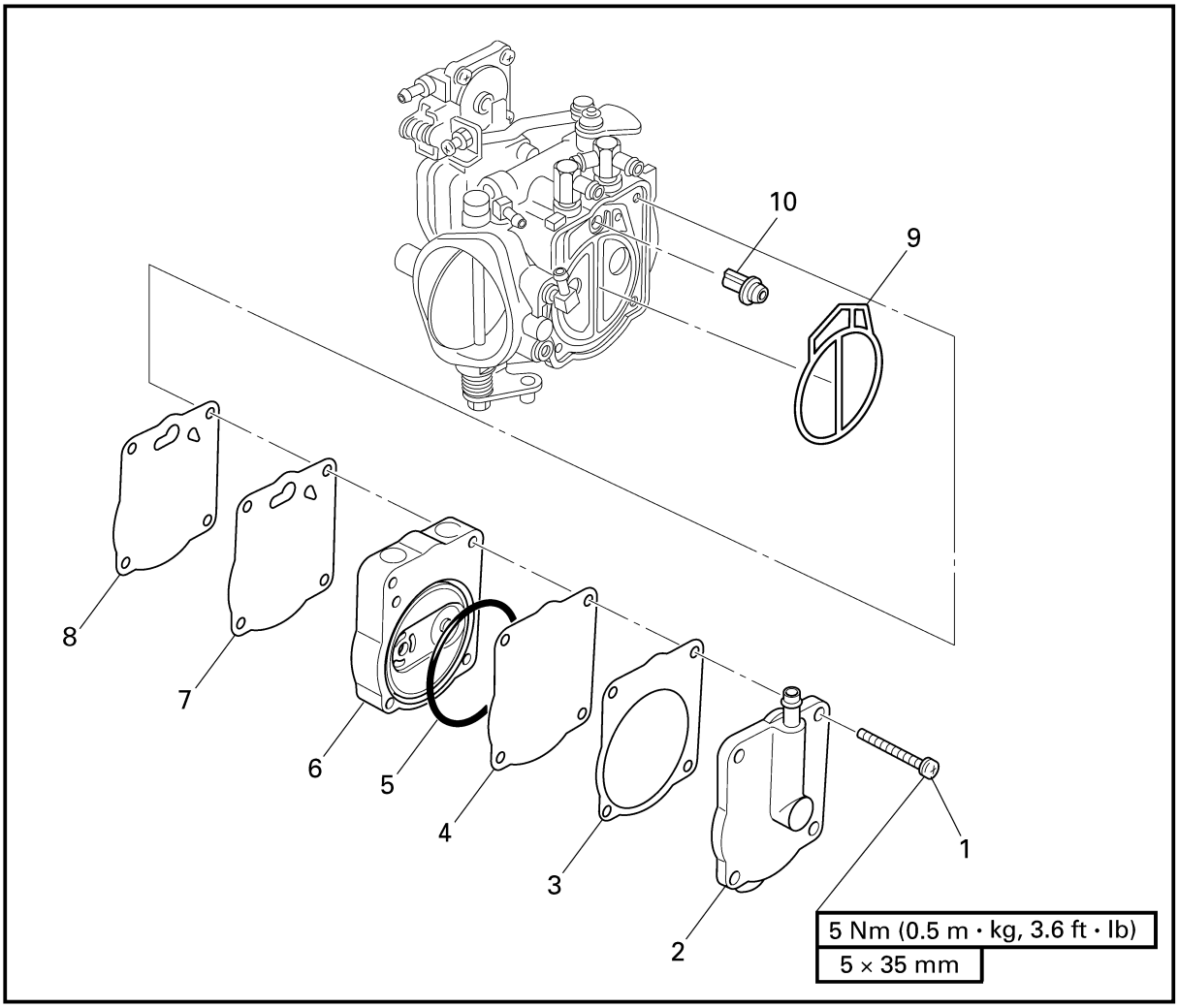
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	FUEL PUMP DISASSEMBLY		Follow the left "Step" for disassembly.
	Carburetors		Refer to "CARBURETOR".
1	Screw	4	
2	Fuel pump cover	1	
3	Gasket	1	**Not reusable**
4	Diaphragm	1	
5	O-ring	1	
6	Diaphragm body	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Rubber diaphragm	1	
8	Diaphragm	1	
9	Packing	1	
10	Fuel filter	1	
			Reverse the disassembly steps for assembly.

SERVICE POINTS

Fuel pump inspection

1. Inspect:
   - Diaphragm
   - Rubber diaphragm
   - Diaphragm body

   Damage → Replace.

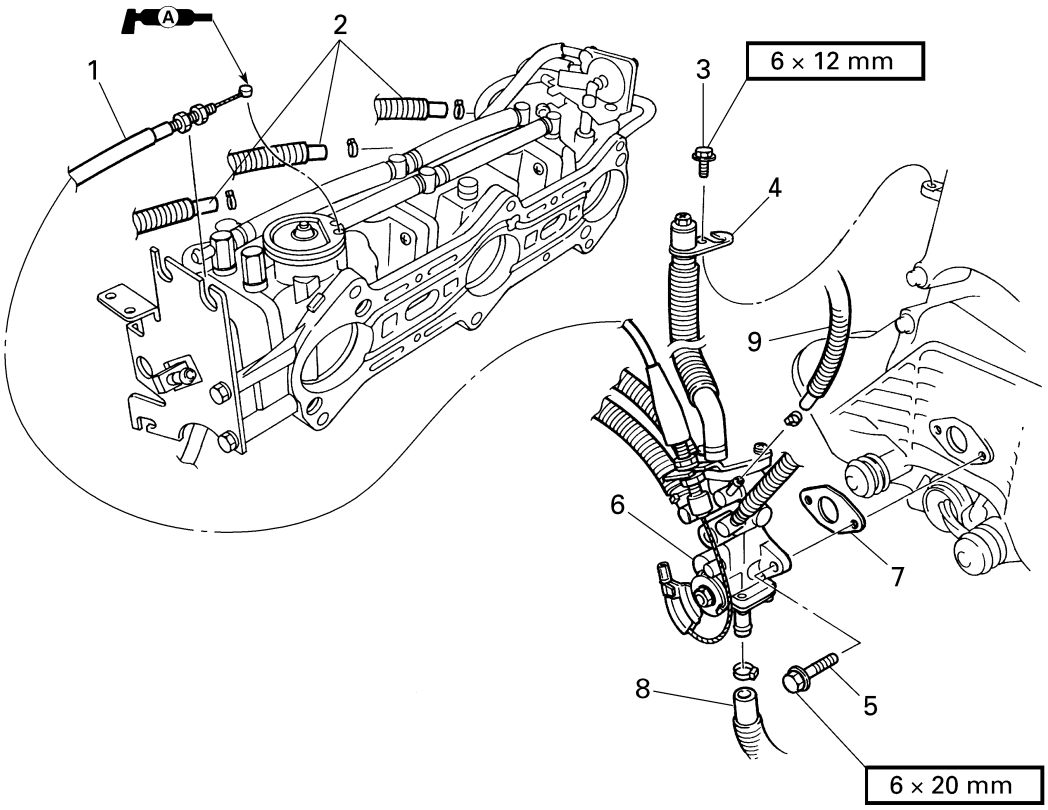
Fuel filter inspection

1. Inspect:
   - Fuel filter

   Clog/contaminants → Clean.
   Damage → Replace.

OIL PUMP

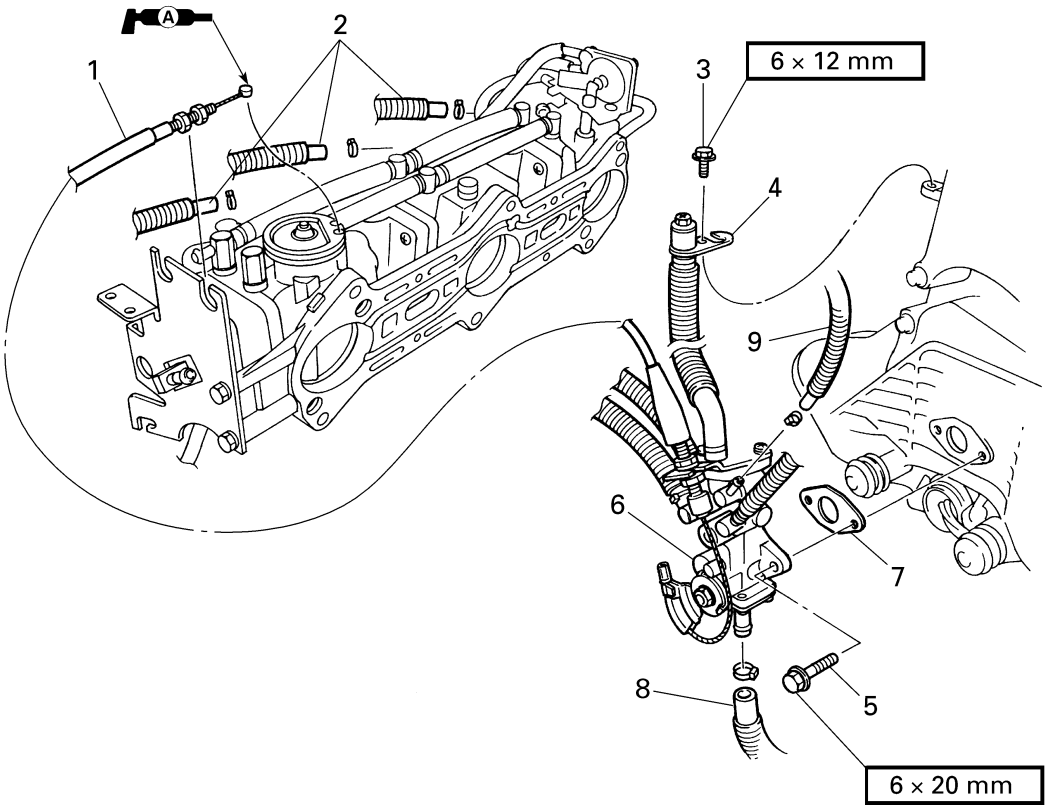
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

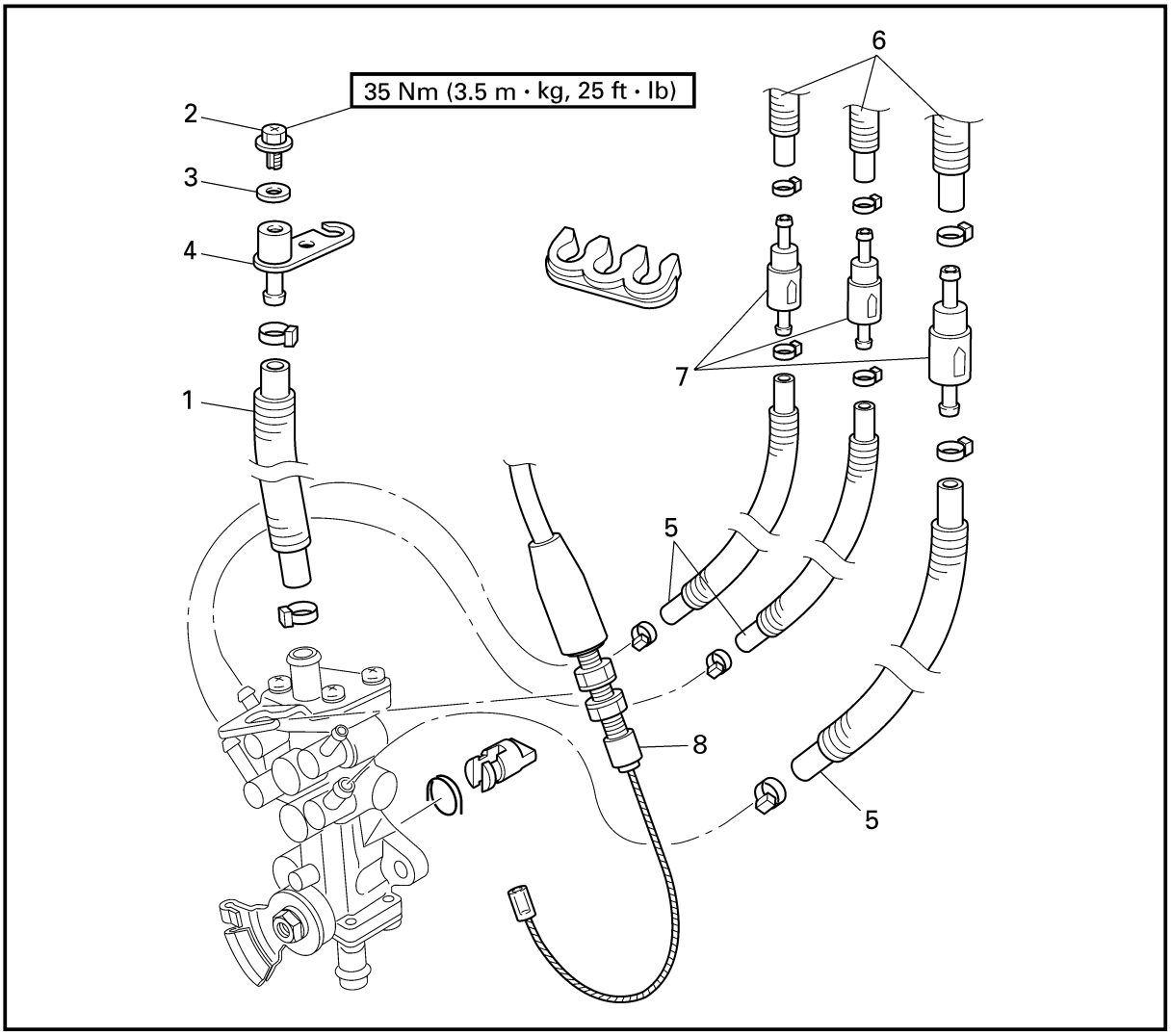
Step	Procedure/Part name	Q'ty	Service points
	OIL PUMP REMOVAL		Follow the left "Step" for removal.
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY" in chapter 5.
	Intake duct		Refer to "INTAKE DUCT AND SILENCER".
1	Oil pump cable	1	
2	Oil delivery hose	3	
3	Bolt	1	
4	Bleed hose stay	1	
5	Bolt	2	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
6	Oil pump assembly	1	
7	Gasket	1	**Not reusable**
8	Oil hose 1	1	
9	Oil hose 2	1	
			Reverse the removal steps for installation.

EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	OIL PUMP HOSES AND CABLE REMOVAL		Follow the left "Step" for removal.
1	Bleed hose	1	
2	Air bleed screw	1	
3	Gasket	1	
4	Bleed hose stay	1	
5	Oil delivery hose 1	3	
6	Oil delivery hose 2	3	
7	Check valve	3	
8	Oil pump cable	1	
			Reverse the removal steps for installation.

SERVICE POINTS

Oil pump inspection

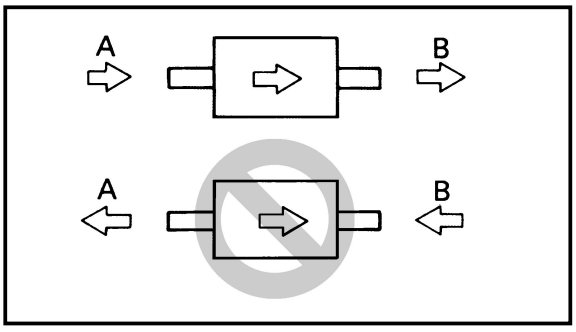
1. Inspect:
   - Oil pump
     Contaminants → Clean.
     Damage/wear → Replace.
   - Oil pump joint piece
     Damage/wear → Replace.

Oil hose inspection

1. Inspect:
   - Oil hose
     Cracks/damage → Clean.

CAUTION:

- **If the oil delivery hoses are not full of oil, fill them up.**
- **After installing the oil injection system, bleed the system of any air.**
  Refer to "OIL INJECTION SYSTEM" in chapter 3.

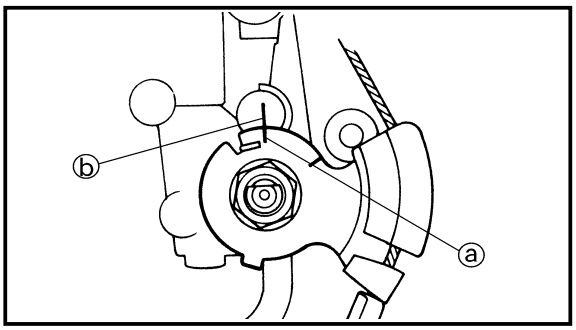


Check valve inspection

1. Check:
   - Check valve
     Faulty → Replace.

Checking steps:

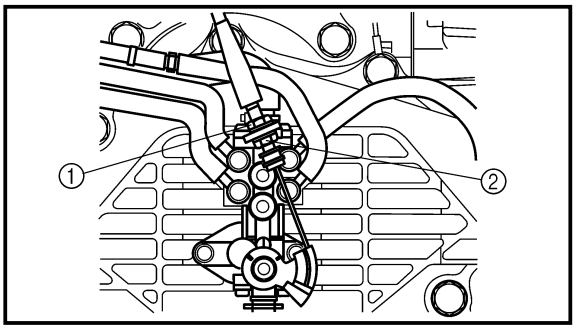
- Connect a hose to the end of check valve "A" and blow into it.
  Air should come out from end "B".
- Connect the hose to the end of check valve "B" and blow into it.
  Air should not come out from end "A".

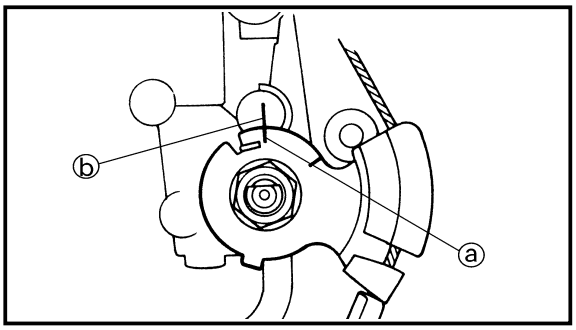


Oil pump cable adjustment

1. Check:
   - Oil pump lever position
     Incorrect → Adjust.

Checking steps:
- Fully close the carburetor throttle valves.
- Check that the mark ⓐ on the oil pump lever is aligned with the mark ⓑ on the oil pump body.





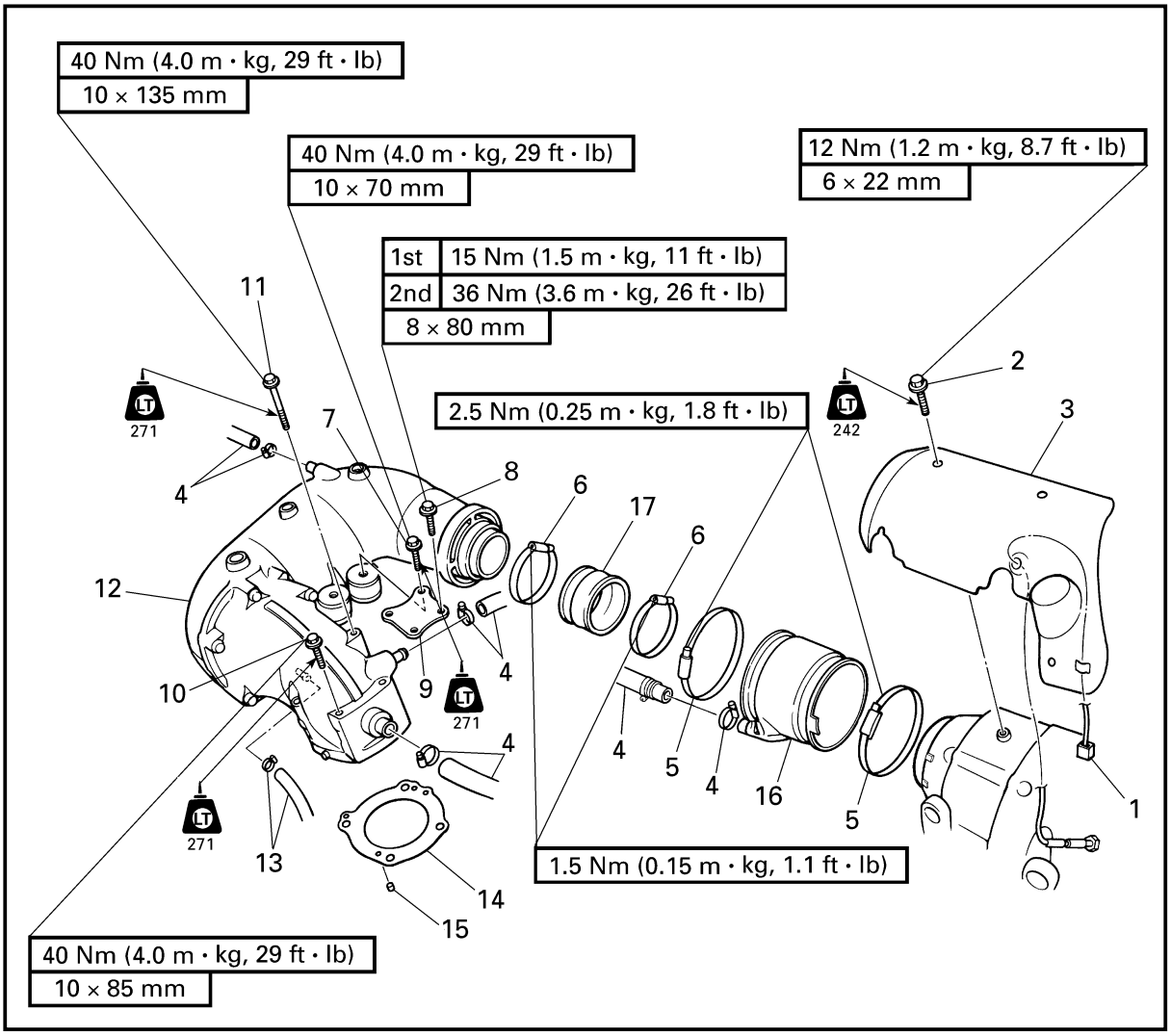
2. Adjust:
   - Oil pump cable

Adjustment steps:
- Loosen the locknut ① and the adjusting nut ②.
- Fully close the carburetor throttle valves.
- Adjust the oil pump cable so that the mark ⓐ on the oil pump lever is aligned with the mark ⓑ on the oil pump body.
- Tighten the adjusting nut and locknut.

CHAPTER 5
POWER UNIT

EXHAUST CHAMBER ASSEMBLY

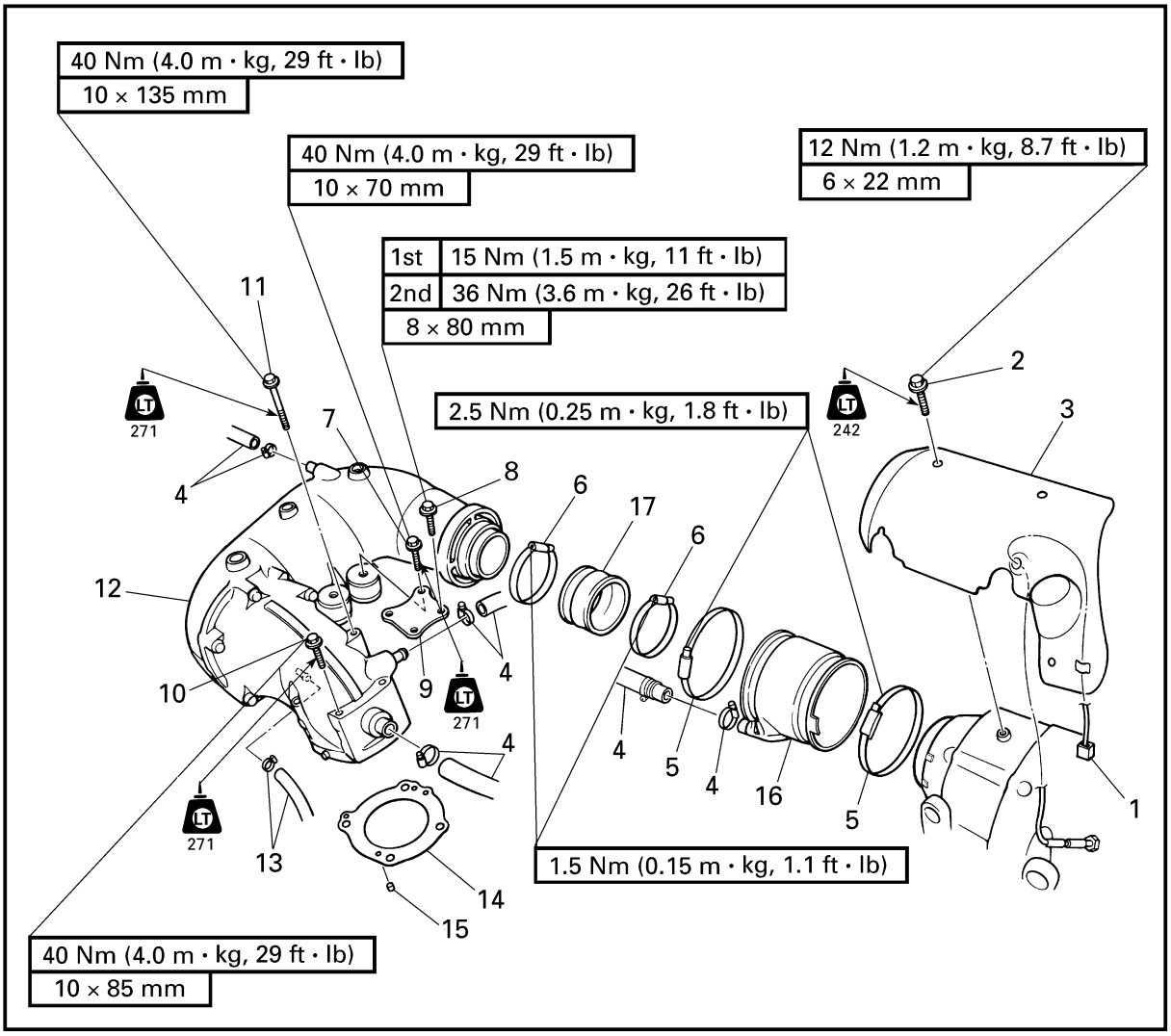
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

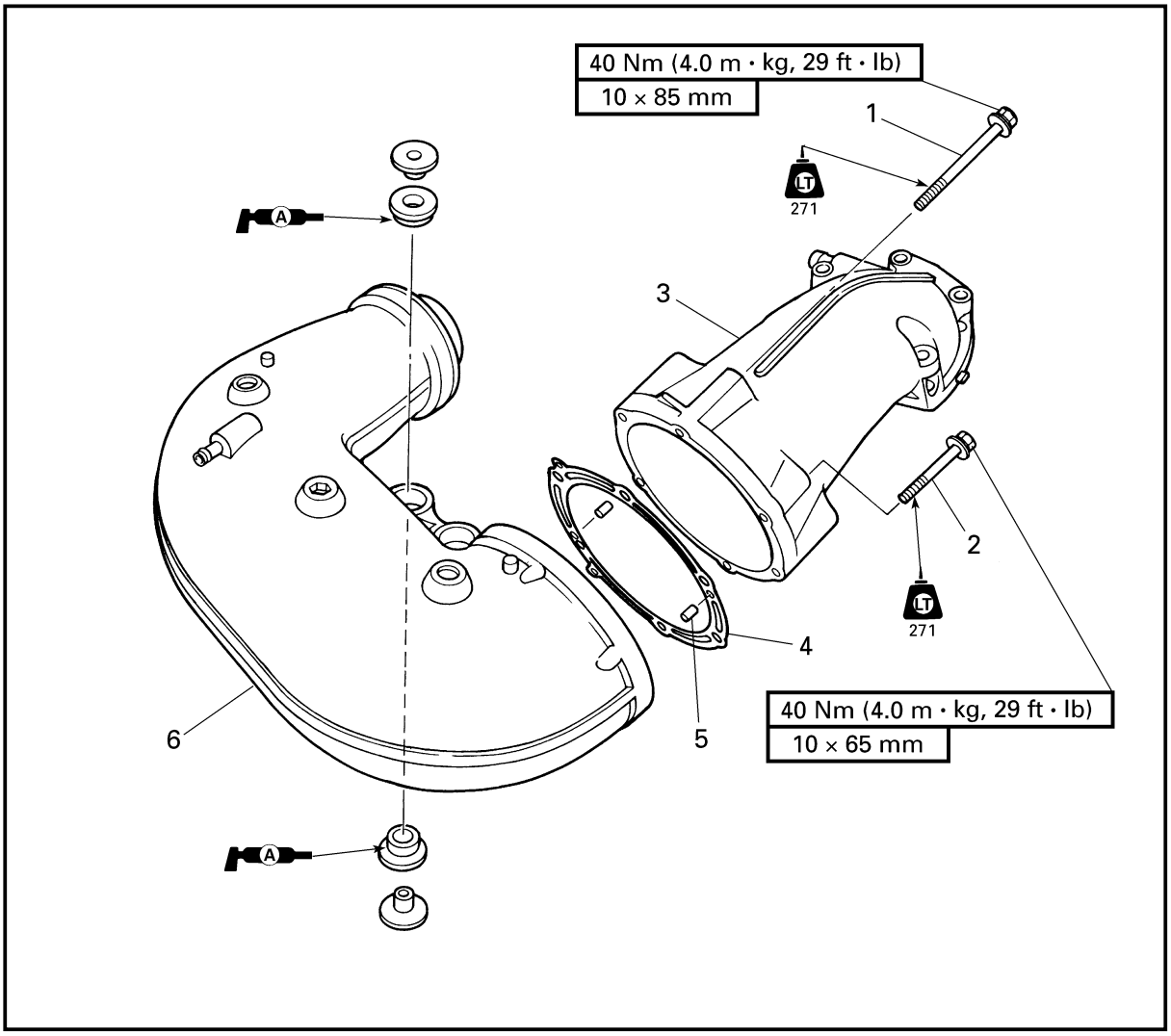
Step	Procedure/Part name	Q'ty	Service points
	EXHAUST CHAMBER ASSEMBLY REMOVAL		Follow the left "Step" for removal.
1	Exhaust temperature sensor coupler	1	
2	Cap/bolt	3/3	
3	Cover	1	
4	Clamp/hose	4/4	
5	Hose clamp	2	
6	Hose clamp	2	
7	Bolt	2	
8	Bolt	2	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
9	Exhaust chamber stay	1	
10	Bolt	3	
11	Bolt	1	
12	Exhaust chamber assembly	1	
13	Clamp/hose	1/1	
14	Gasket	1	**Not reusable**
15	Pin	2	
16	Outer exhaust joint	1	
17	Inner exhaust joint	1	
			Reverse the removal steps for installation.

EXPLODED DIAGRAM

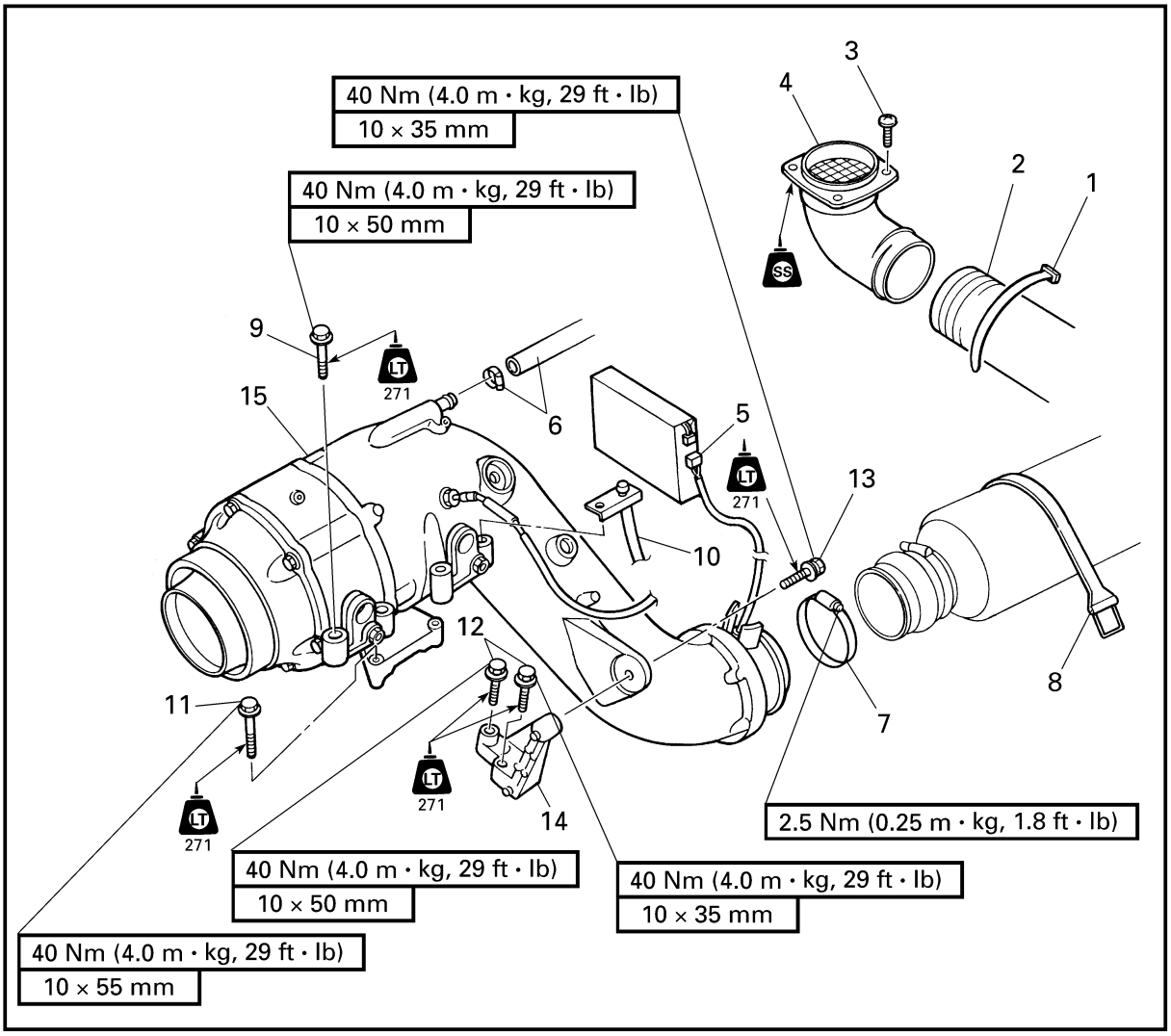


REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	EXHAUST CHAMBER DISASSEMBLY		Follow the left "Step" for disassembly.
1	Bolt	5	
2	Bolt	1	
3	Exhaust chamber joint	1	
4	Gasket	1	**Not reusable**
5	Pin	2	
6	Exhaust chamber	1	
			Reverse the disassembly steps for assembly.

MUFFLER ASSEMBLY

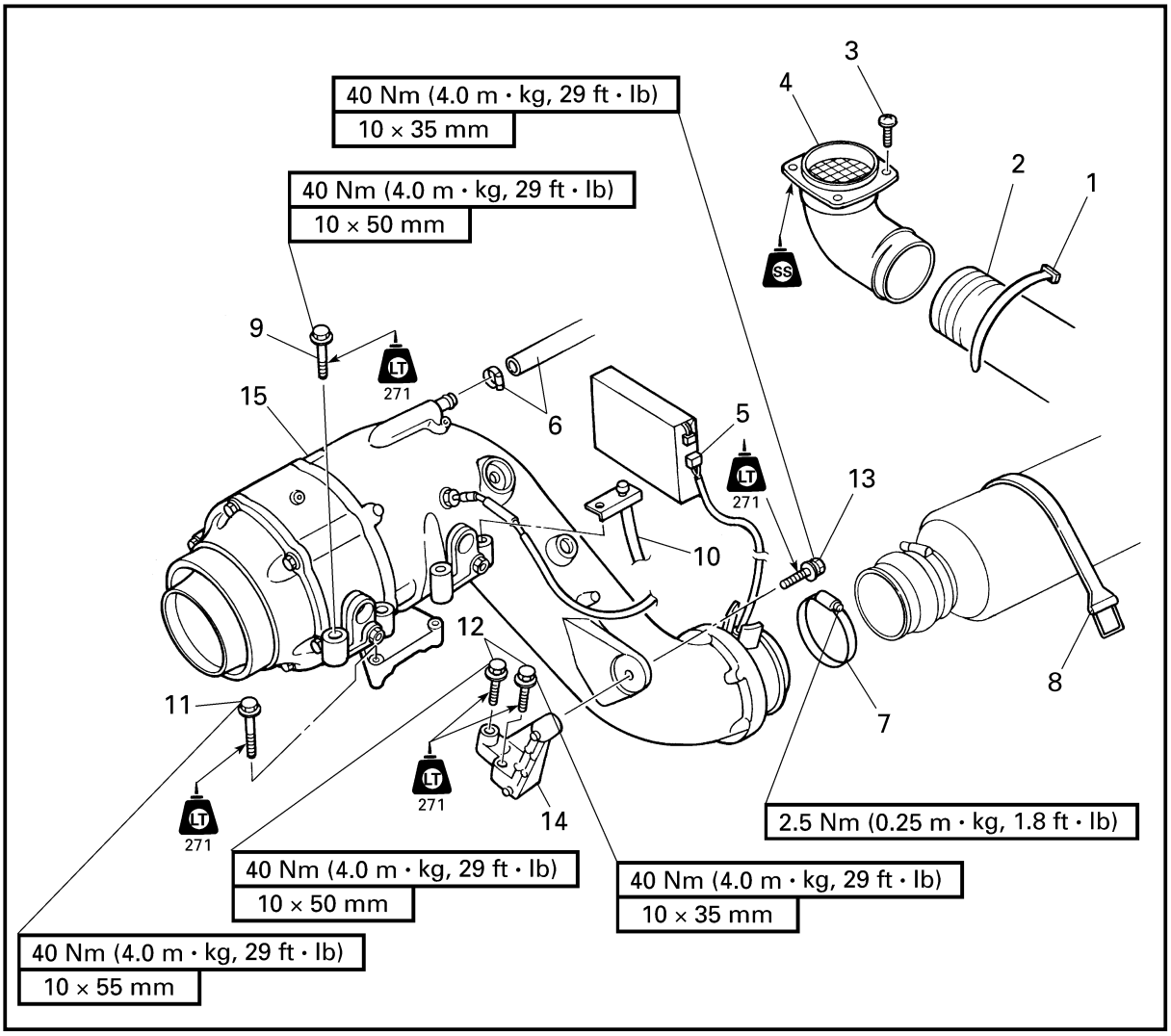
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

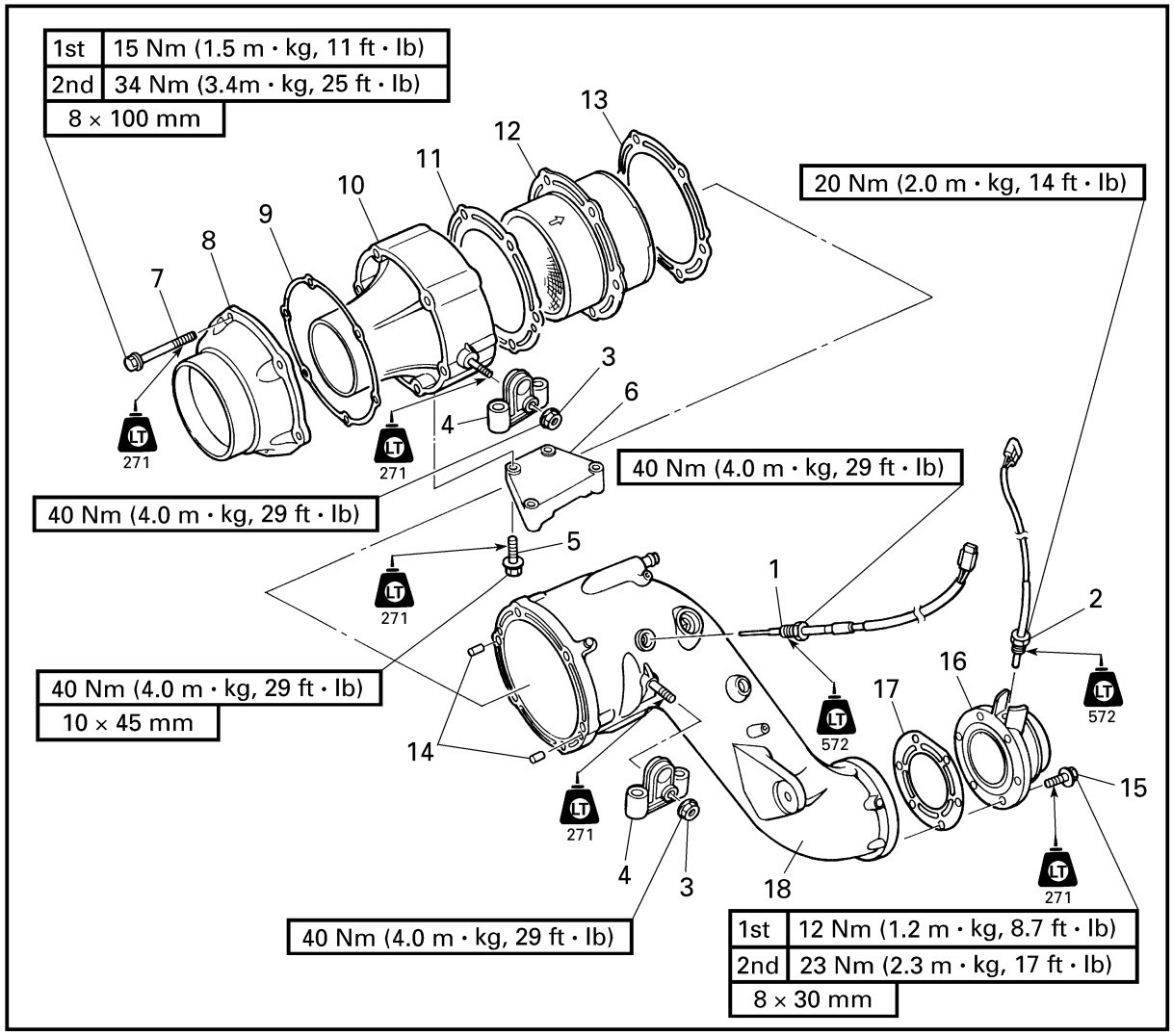
Step	Procedure/Part name	Q'ty	Service points
	MUFFLER ASSEMBLY REMOVAL		Follow the left "Step" for removal.
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY".
	Cylinder head		Refer to "CYLINDER HEAD".
1	Band	1	
2	Ventilation hose	1	
3	Screw	4	
4	Ventilation duct	1	
5	Water temperature sensor coupler	1	
6	Clamp/hose	1/1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Hose clamp	1	
8	Water lock band	1	Slide the water lock toward back to disconnect the muffler assembly.
9	Bolt	4	
10	Gear case grease hose	1	
11	Bolt	2	
12	Bolt	2	
13	Bolt	1	
14	Muffler stay 2	1	
15	Muffler assembly	1	Reverse the removal steps for installation.

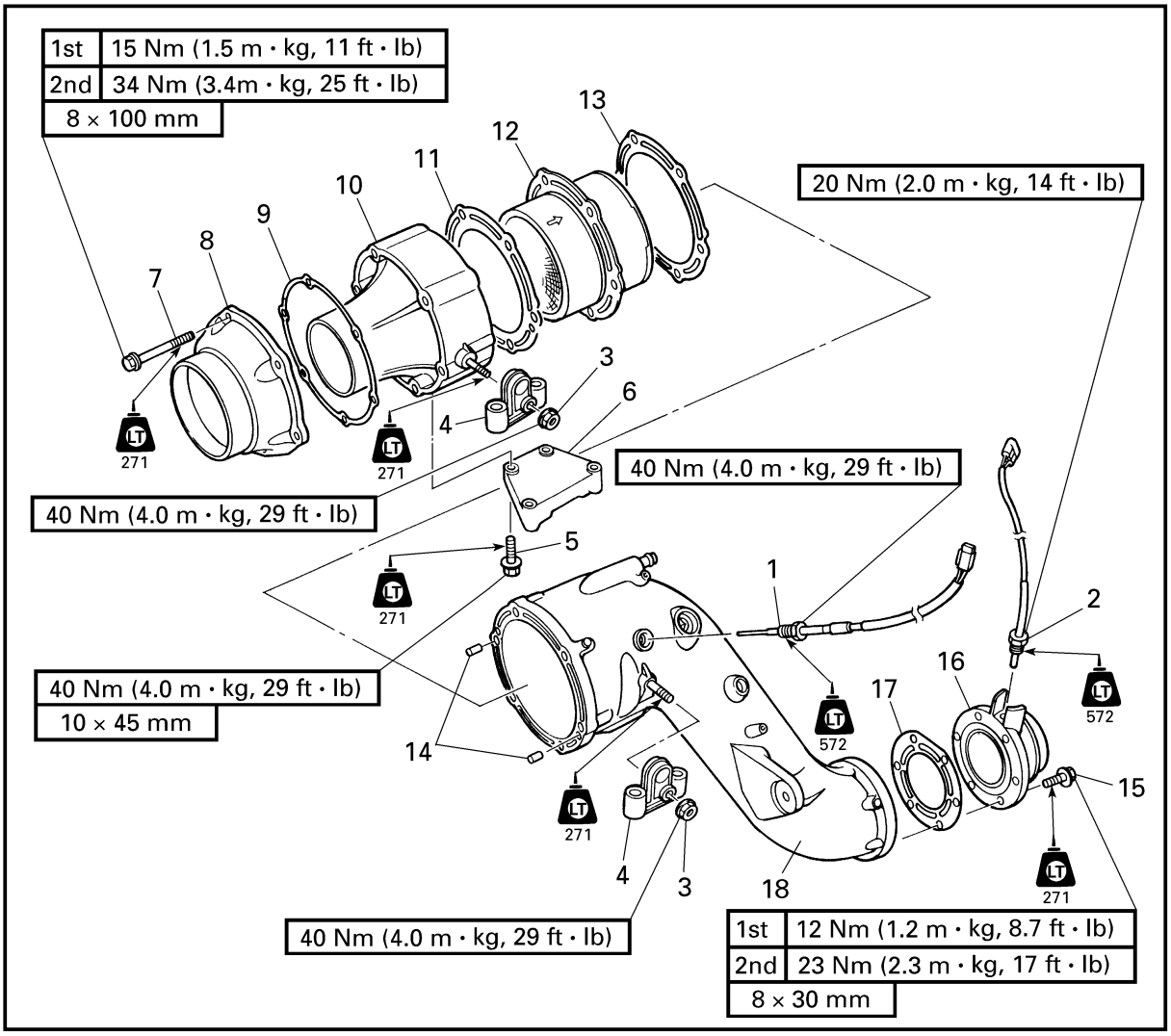
EXPLODED DIAGRAM



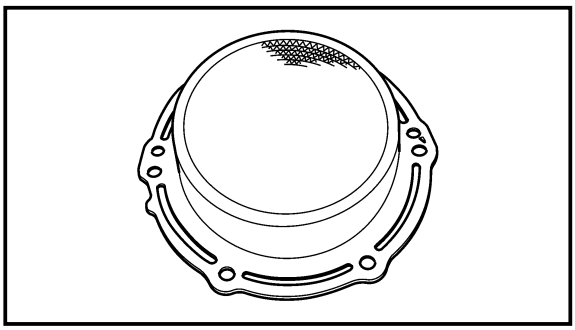
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	MUFFLER DISASSEMBLY		Follow the left "Step" for disassembly.
1	Exhaust temperature sensor	1	
2	Water temperature sensor	1	
3	Nut	2	
4	Hanger	2	
5	Bolt	2	
6	Muffler stay	1	
7	Bolt	6	
8	Cover	1	
9	Gasket	1	**Not reusable**

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
10	Catalyst housing	1	
11	Gasket	1	**Not reusable**
12	Catalyst	1	
13	Gasket	1	**Not reusable**
14	Pin	2	
15	Bolt	6	
16	Mixing joint	1	
17	Gasket	1	**Not reusable**
18	Muffler	1	
			Reverse the disassembly steps for assembly.



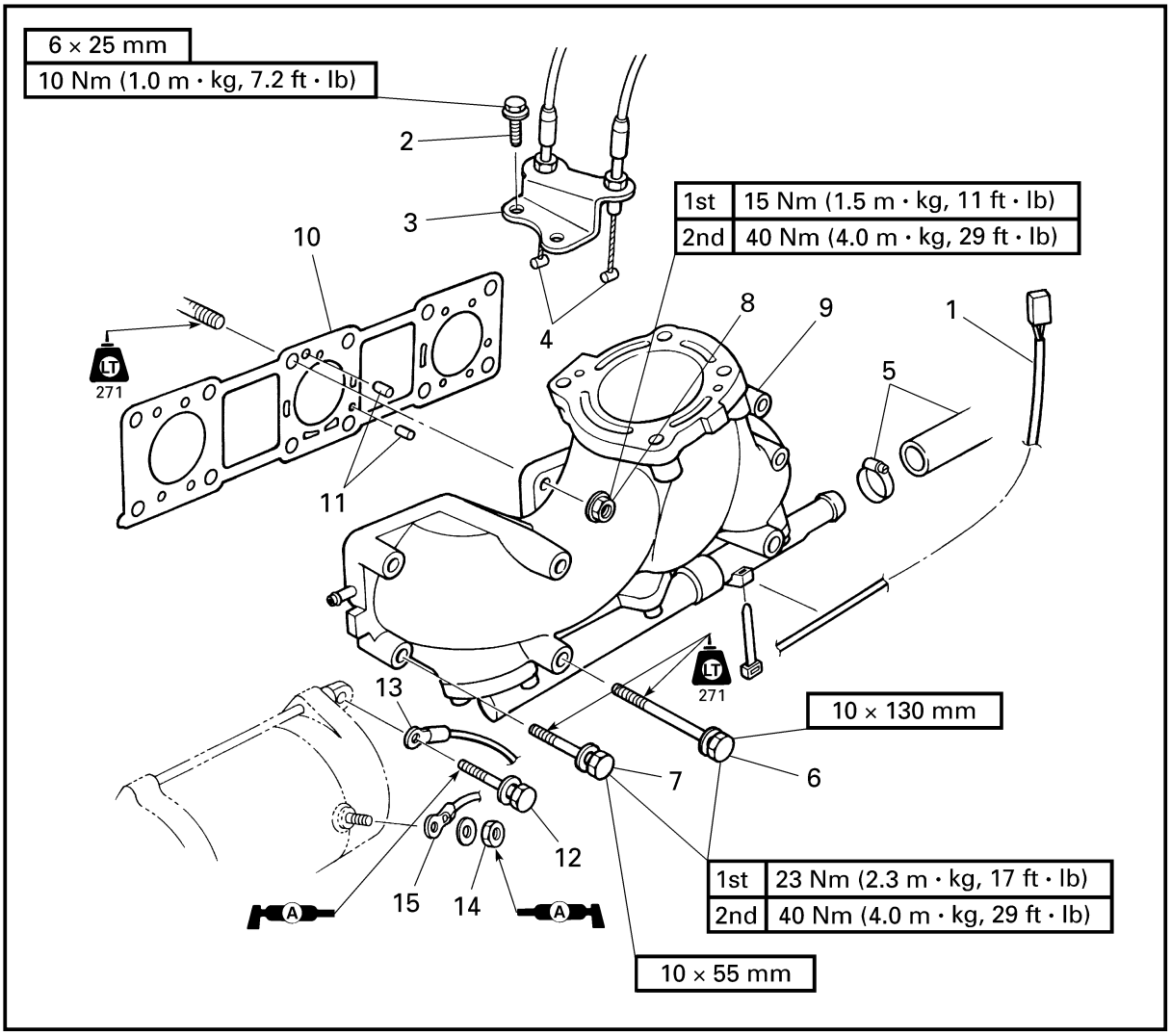
SERVICE POINT

Catalyst inspection

1. Inspect:
   - Catalyst
     Cracks/damage → Replace.

EXHAUST MANIFOLD AND LEADS

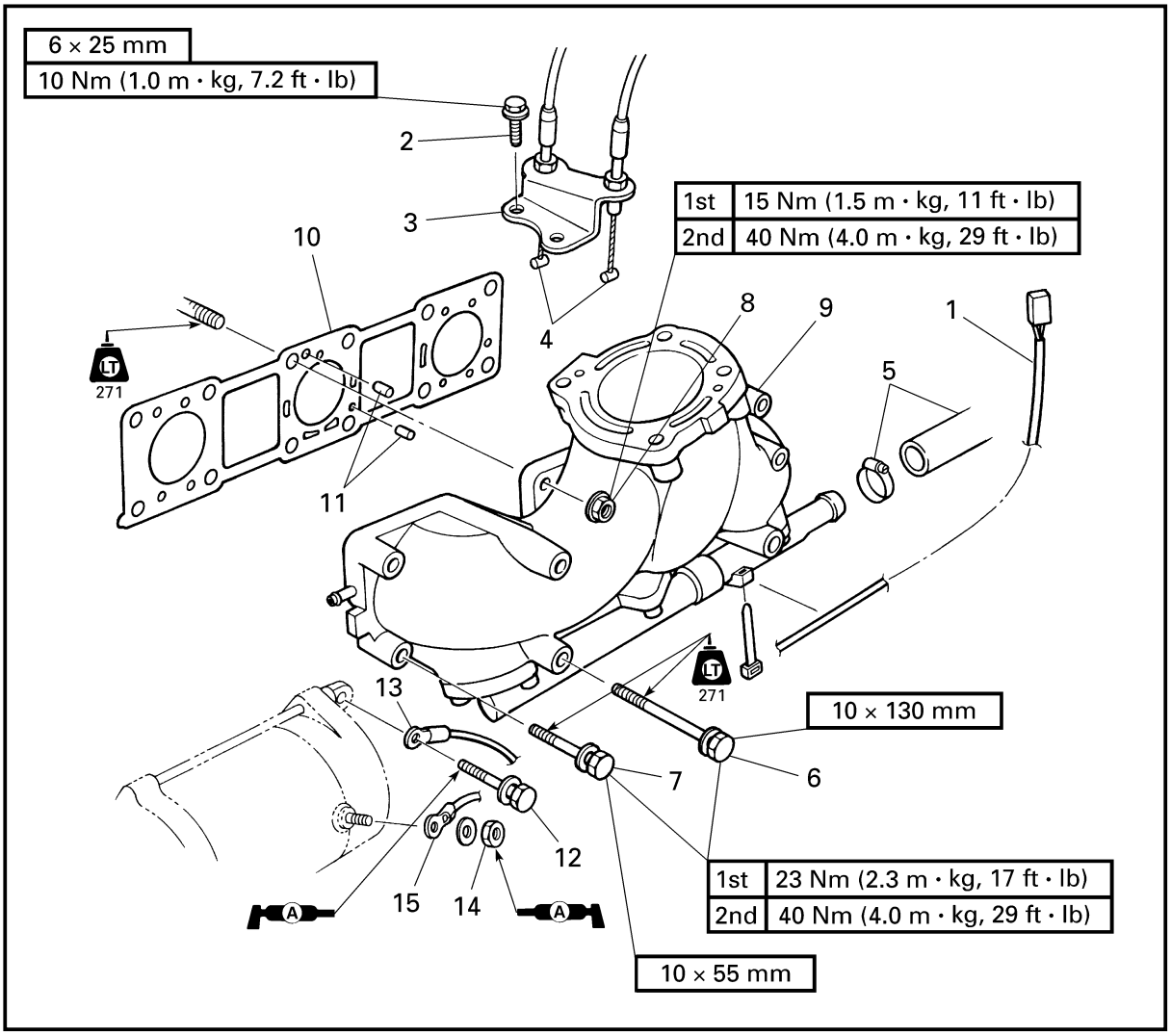
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

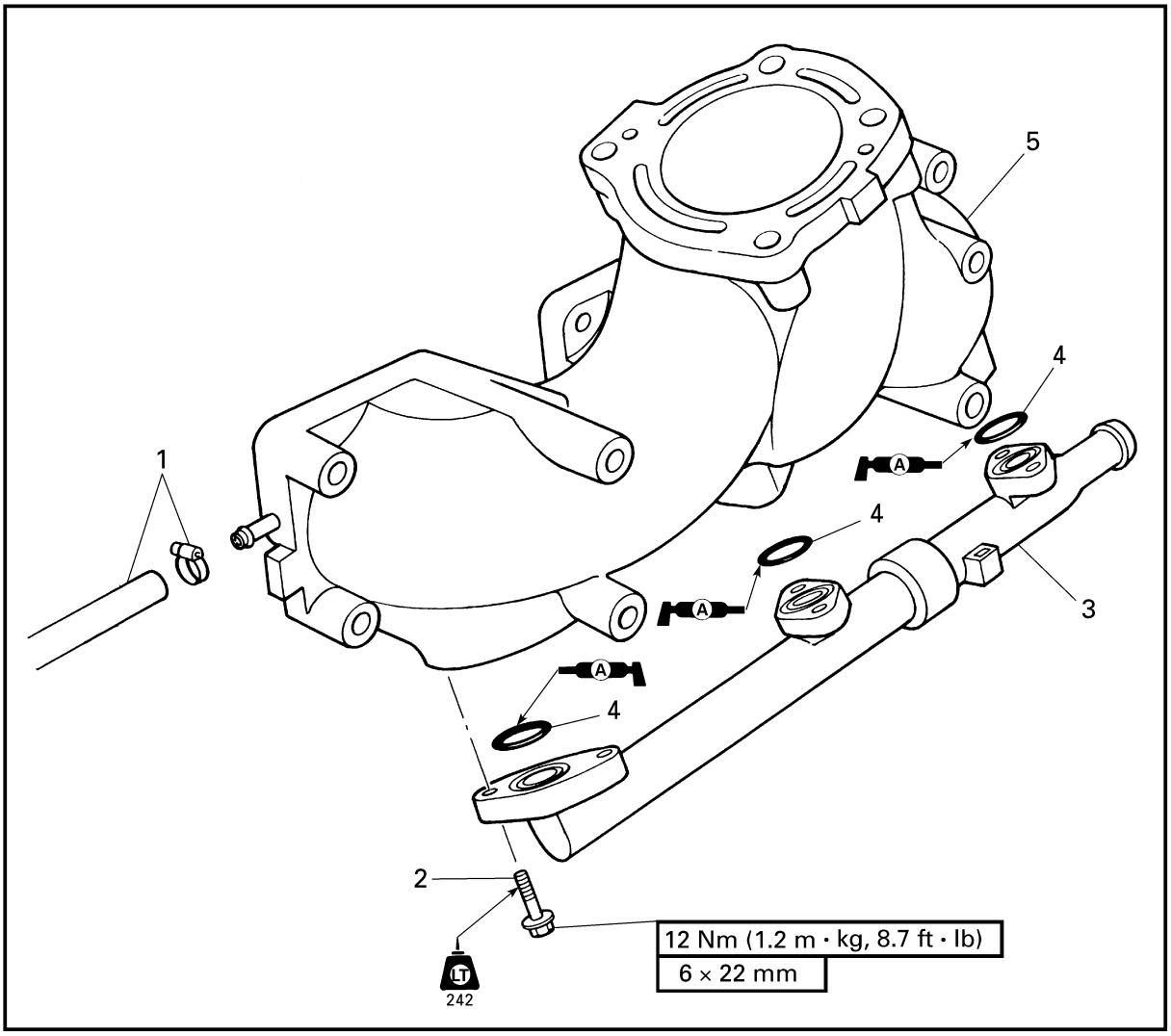
Step	Procedure/Part name	Q'ty	Service points
	EXHAUST MANIFOLD AND LEADS REMOVAL		Follow the left "Step" for removal.
	Battery lead (negative and positive)		Refer to "ELECTRICAL BOX" in chapter 7.
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY".
1	AC magneto coupler	1	
2	Bolt	2	
3	YPVS cable holder	1	
4	YPVS cable	2	
5	Clamp/hose	1/1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
6	Bolt	4	
7	Bolt	6	
8	Nut	2	
9	Exhaust manifold	1	
10	Gasket	1	**Not reusable**
11	Pin	2	
12	Bolt	1	
13	Battery negative lead	1	
14	Nut/washer	1/1	
15	Starter motor lead	1	
			Reverse the removal steps for installation.

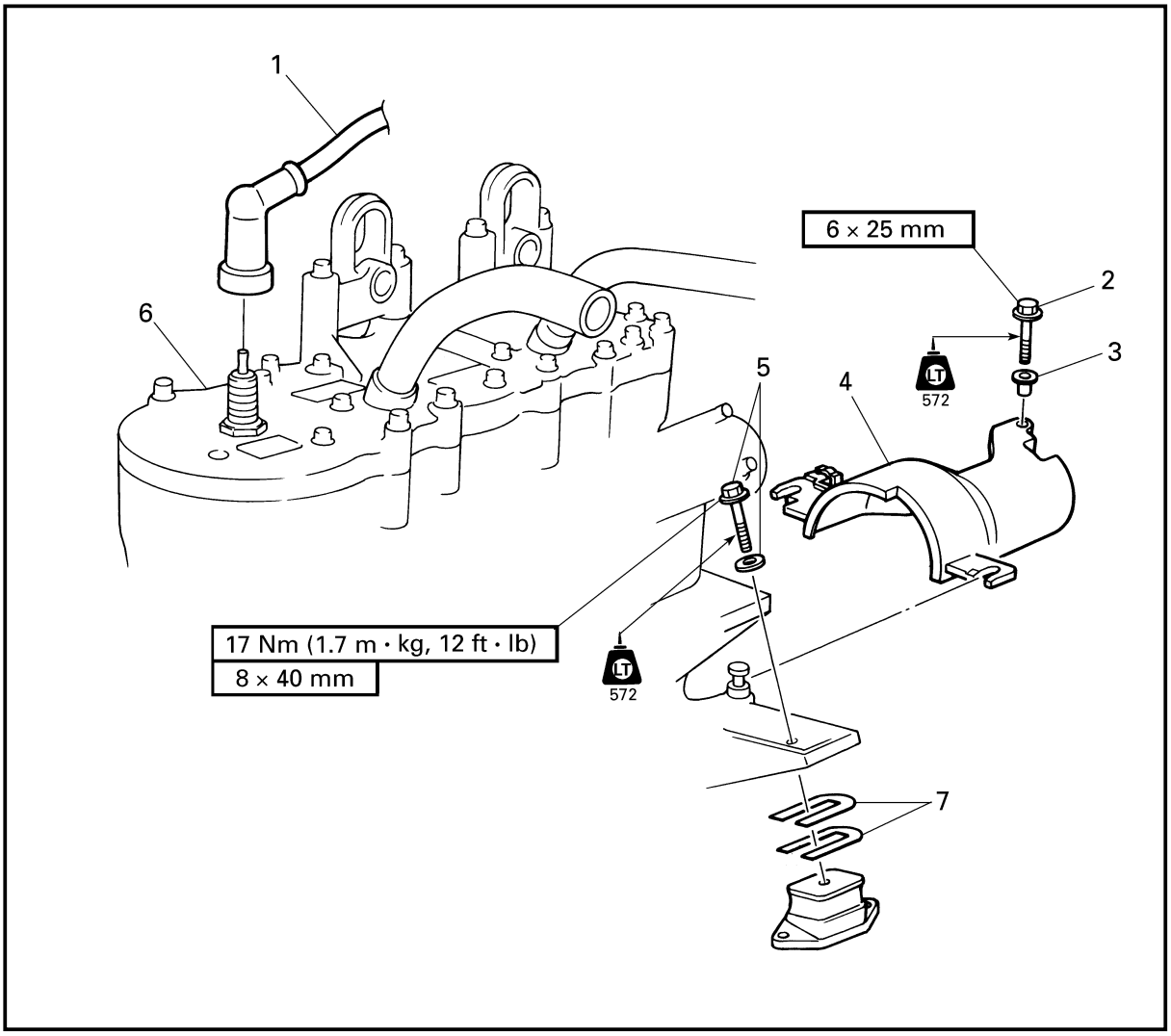
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	EXHAUST MANIFOLD DISASSEMBLY		Follow the left "Step" for disassembly.
1	Clamp/hose	1/1	
2	Bolt	6	
3	Joint pipe	1	
4	O-ring	3	
5	Exhaust manifold	1	
			Reverse the disassembly steps for assembly.

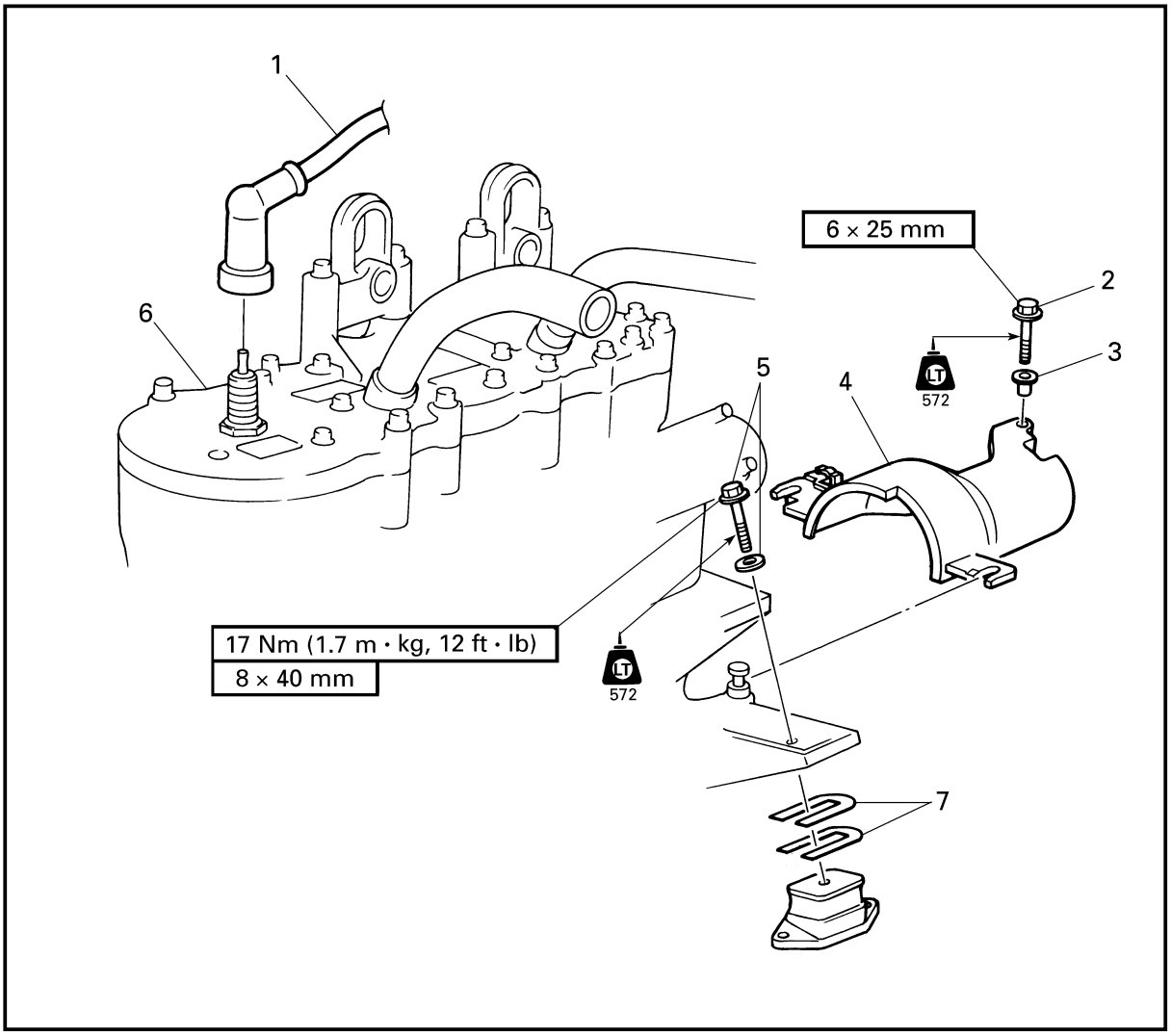
ENGINE UNIT
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	ENGINE UNIT REMOVAL		Follow the left "Step" for removal.
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY".
	Muffler assembly		Refer to "MUFFLER ASSEMBLY".
	Carburetor		Refer to "CARBURETOR" in chapter 4.
	Oil pump		Refer to "OIL PUMP" in chapter 4.
1	Spark plug lead	3	
2	Bolt	1	
3	Collar	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
4	Coupling cover	1	
5	Bolt/washer	4/4	
6	Engine assembly	1	
7	Shim	*	Install the shims original position.
			Reverse the removal steps for installation.

*: As required

SERVICE POINTS

Shim removal

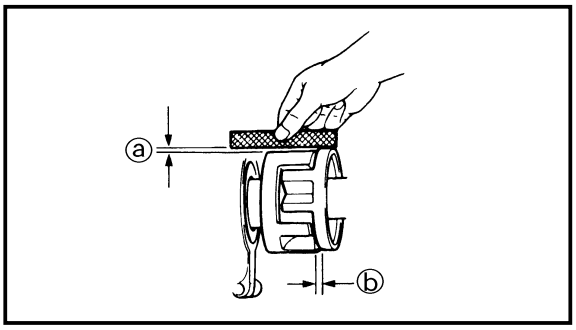
1. Remove:
   - Shims

NOTE:

To ease reassembly and coupling alignment, remove the shims and organize them in their respective groups (e.g., front right, rear left) prior to removing the mounting bolts.

Engine mount inspection

1. Inspect:
   - Engine mounts
     Cracks/damage → Replace.



Coupling clearance inspection

1. Measure:
   - Clearance ⓐ
   - Clearance ⓑ
     (with a straightedge and thickness gauge)
     Out of specification → Adjust with the shims.

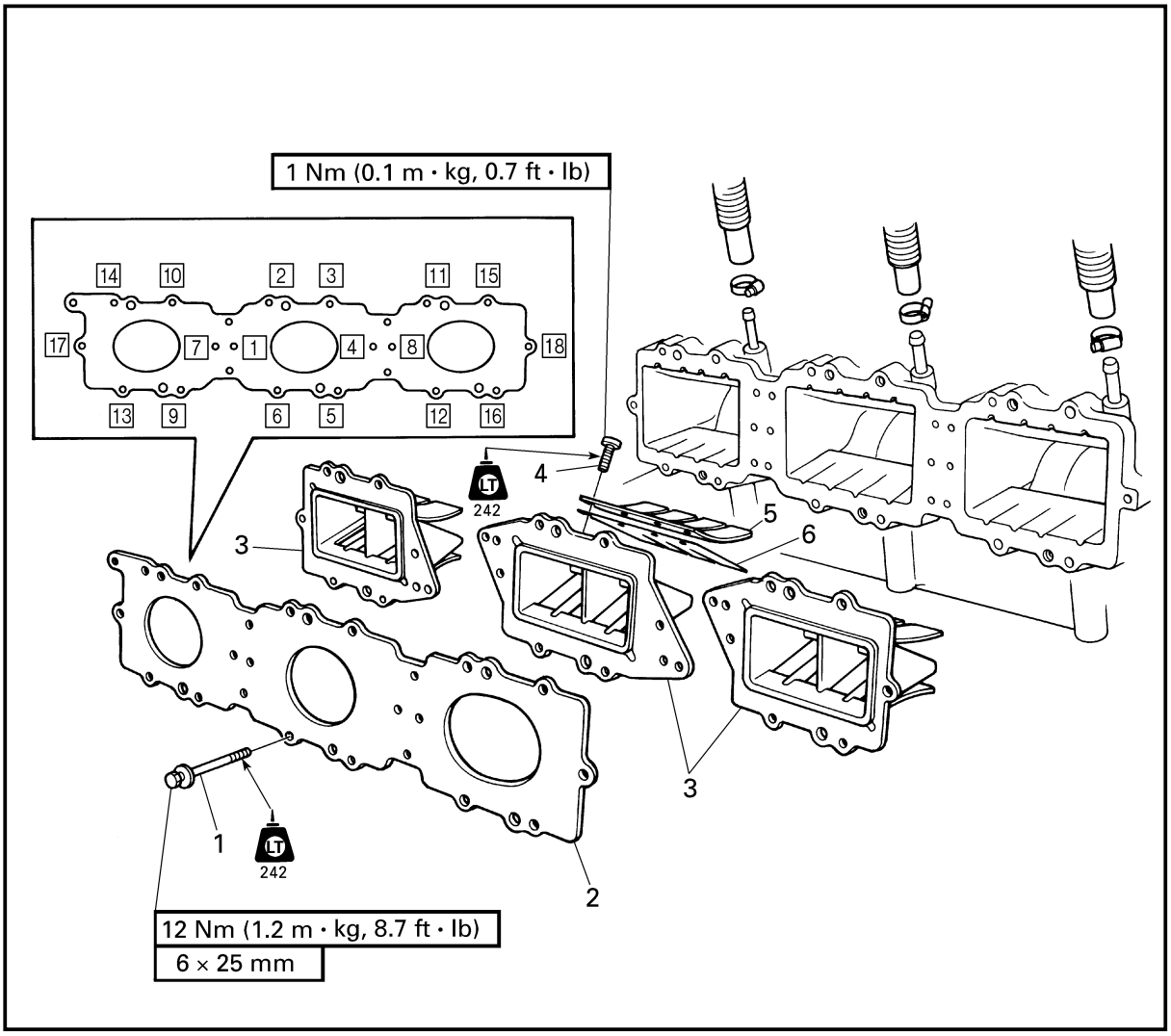
NOTE:

Before measuring the clearance, remove the rubber damper.

Clearance ⓐ:
0 ~ 1.0 mm (0 ~ 0.039 in)
Clearance ⓑ:
2 ~ 4 mm (0.079 ~ 0.157 in)

REED VALVES

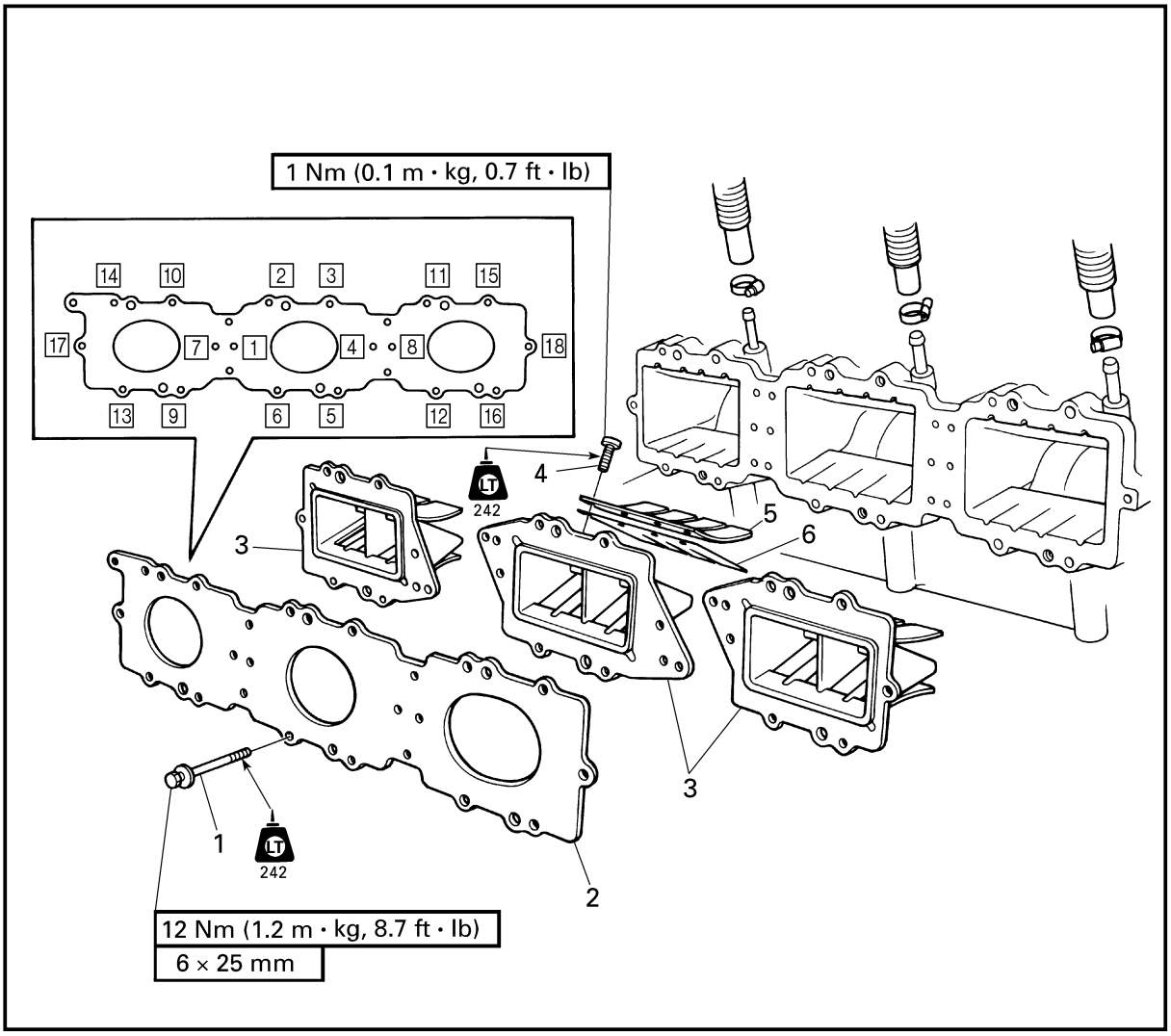
EXPLODED DIAGRAM



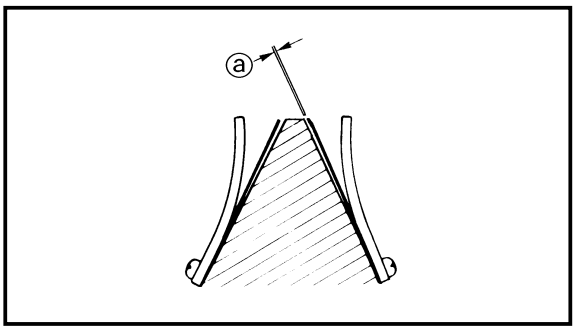
REMOVAL AND INSTALLATION CHART

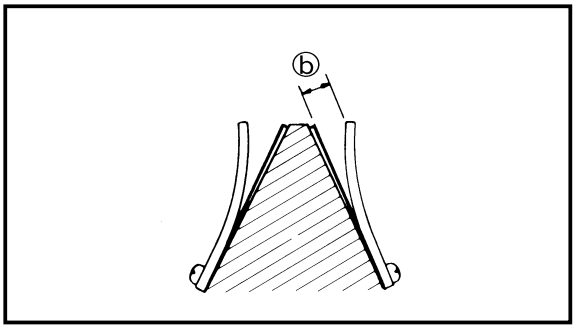
Step	Procedure/Part name	Q'ty	Service points
	REED VALVE REMOVAL		Follow the left "Step" for removal.
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY".
	Muffler assembly		Refer to "MUFFLER ASSEMBLY".
	Carburetor unit		Refer to "CARBURETOR UNIT" in chapter 4.
1	Bolt	18	**NOTE:**
2	Reed valve plate	1	Tighten the bolts in the proper sequence as shown.

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
3	Reed valve assembly	3	
4	Screw	24	
5	Valve stopper	6	
6	Reed valve	6	
			Reverse the removal steps for installation.





SERVICE POINTS

Reed valve inspection

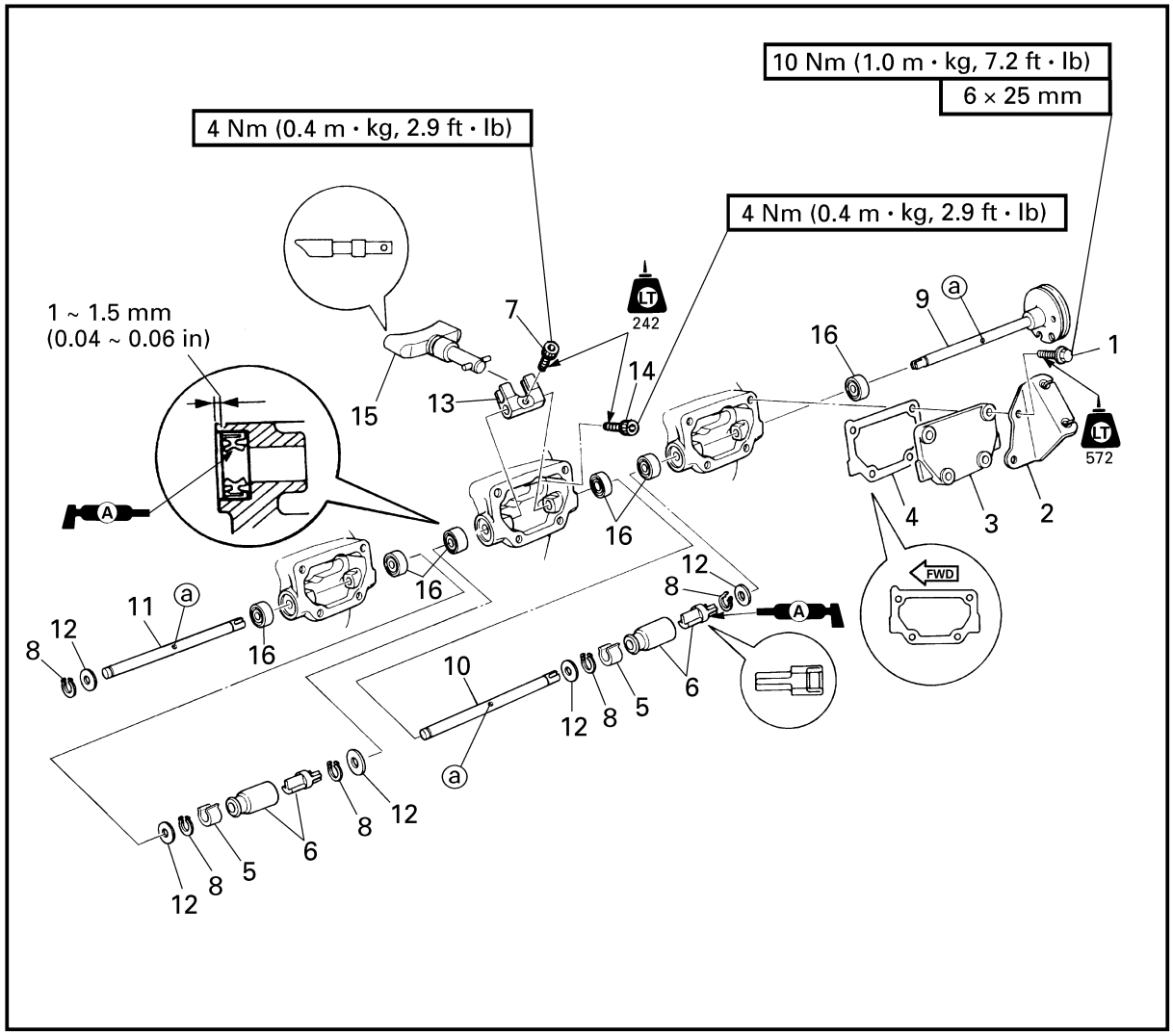
1. Inspect:
   - Reed valves
     Cracks/damage → Replace.
2. Measure:
   - Valve bending ⓐ
     Out of specification → Replace.

Max. valve bending:
0.2 mm (0.01 in)

3. Measure:
   - Valve stopper height ⓑ
     Out of specification → Adjust or replace.

Valve stopper height:
10.4 ~ 11.0 mm (0.41 ~ 0.43 in)

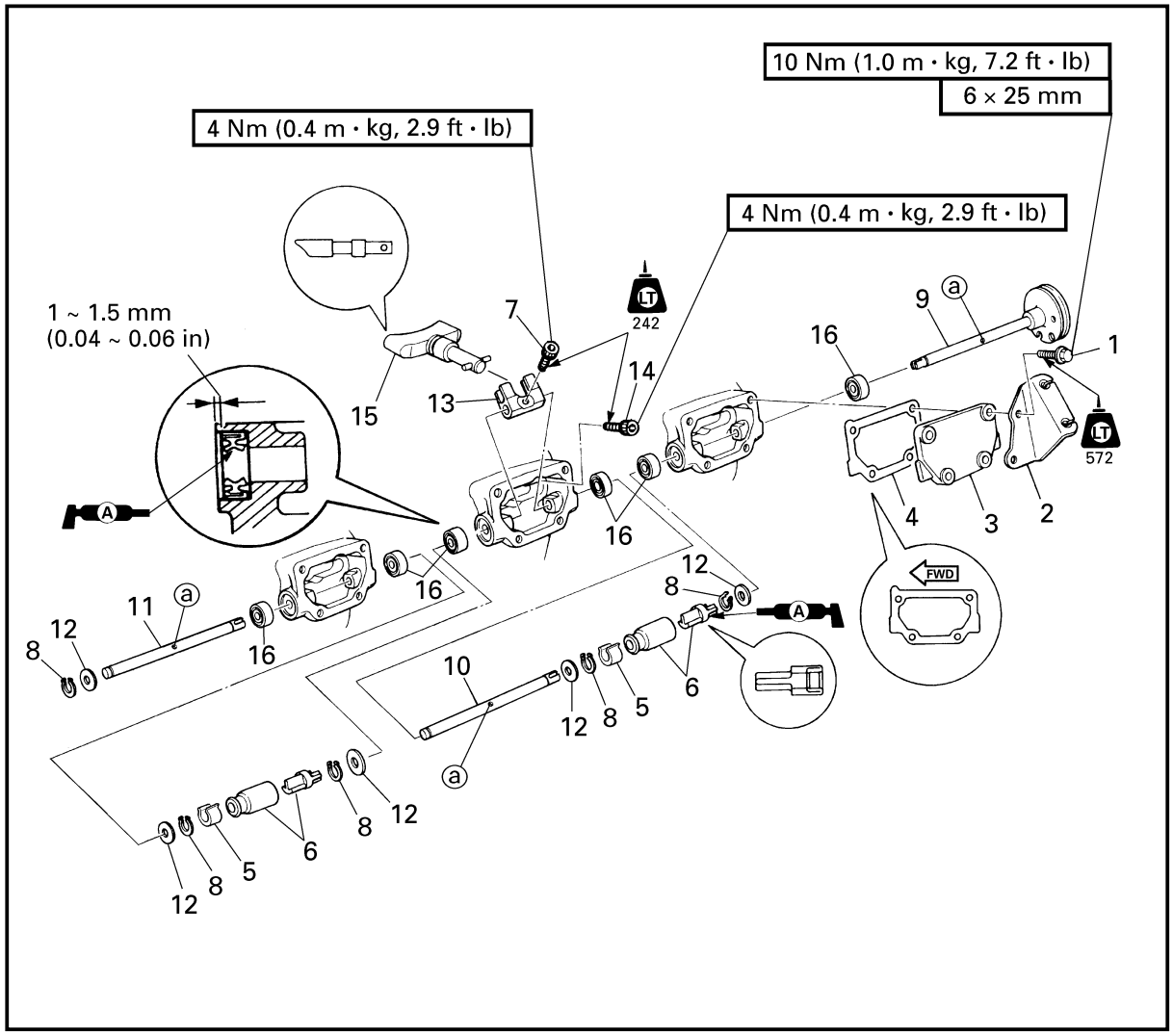
YPVS
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

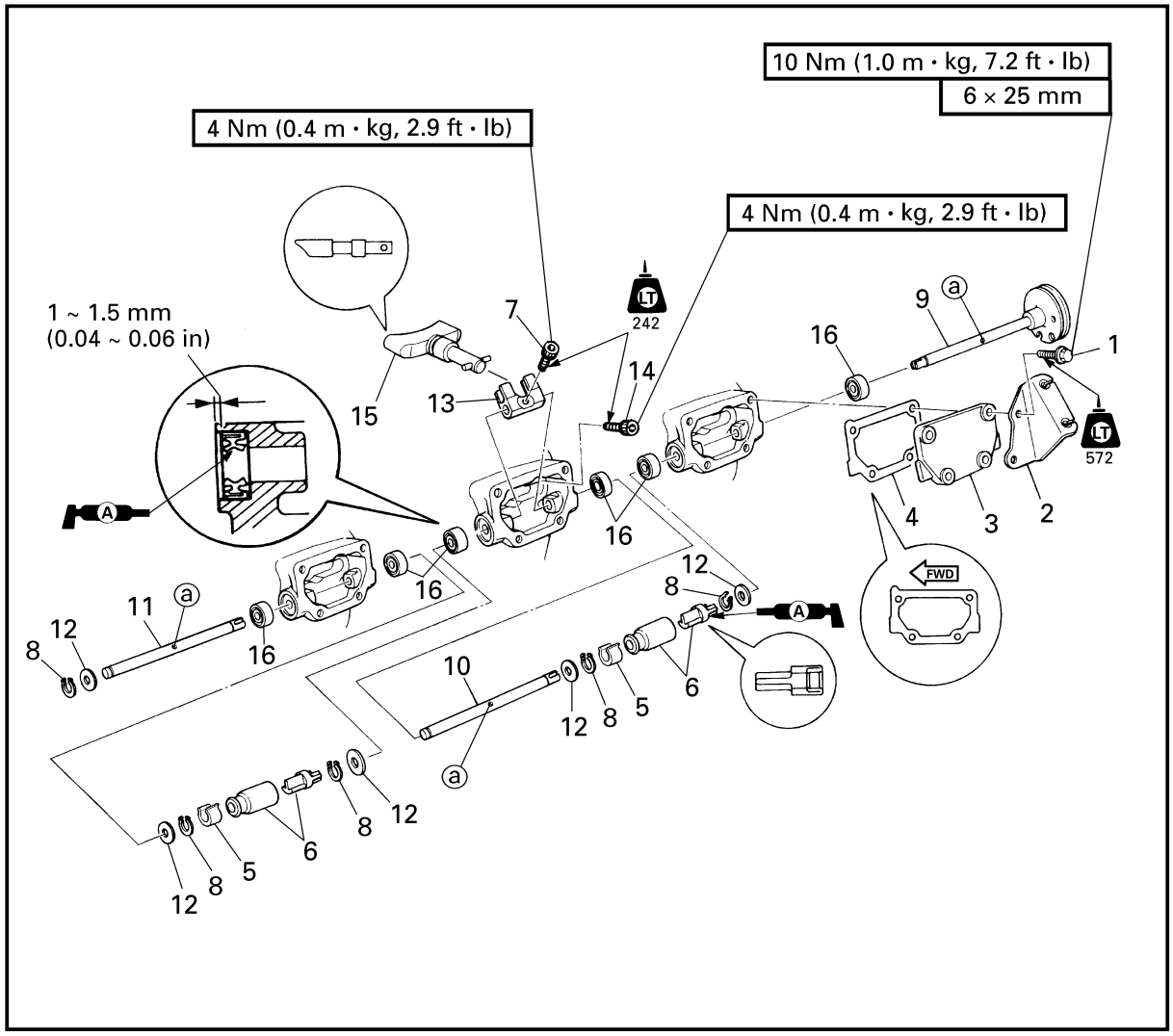
Step	Procedure/Part name	Q'ty	Service points
	YPVS REMOVAL		Follow the left "Step" for removal.
	YPVS cable 1 and 2		Refer to "EXHAUST MANIFOLD AND LEADS".
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY".
1	Bolt	12	
2	YPVS cable bracket	1	
3	YPVS valve cover	3	
4	Gasket	3	**Not reusable**
5	Spacer	2	
6	Link joint/cover	2/2	

EXPLODED DIAGRAM

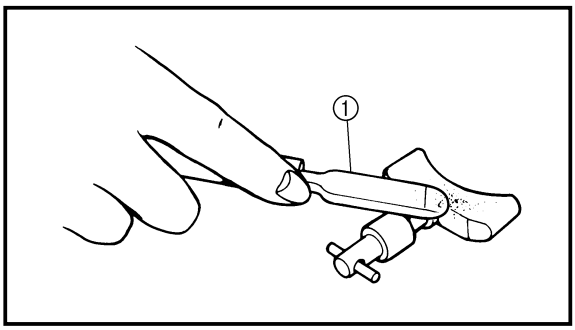


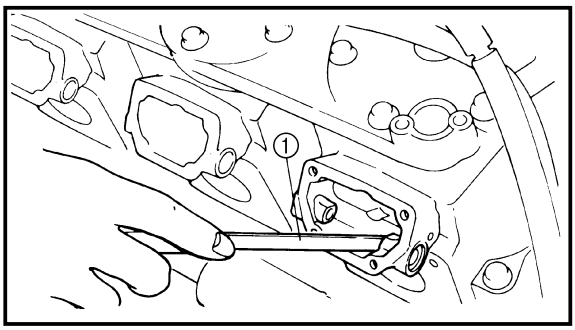
Step	Procedure/Part name	Q'ty	Service points
7	Bolt (M4)	3	**NOTE:** During installation, align the hole ⓐ in the YPVS shaft with the screw.
8	Circlip	5	**Not reusable**
9	Shaft 3	1	
10	Shaft 2	1	
11	Shaft 1	1	
12	Washer	5	
13	YPVS valve lever	3	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
14	Bolt (M5)	3	
15	YPVS valve assembly	3	
16	Oil seal	6	**NOTE:** If the YPVS shaft is removed, the oil seal must be replaced. Reverse the removal steps for installation.





SERVICE POINTS

YPVS valve inspection

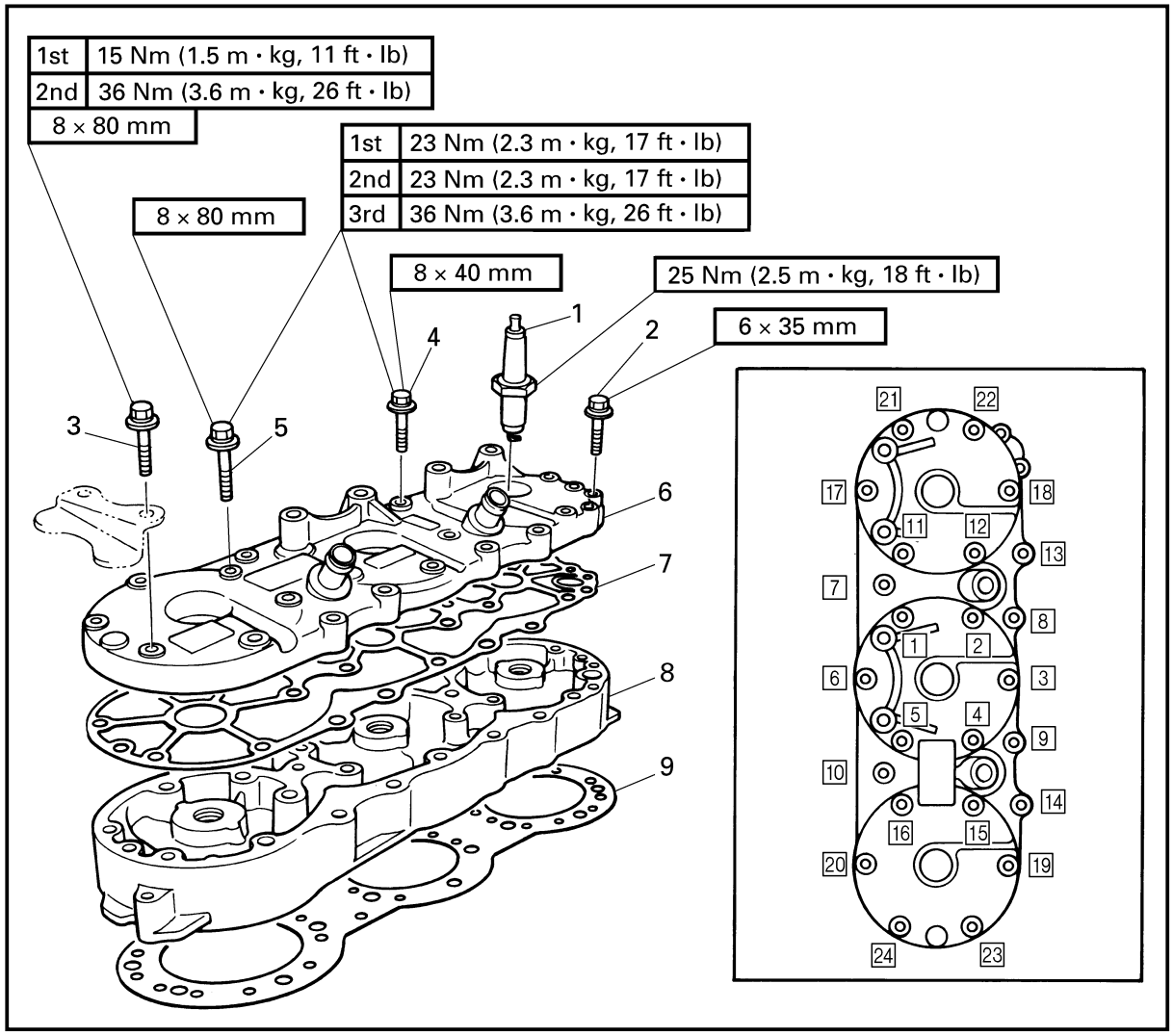
1. Eliminate:
   - Carbon deposits
     (with a rounded scraper ①)

CAUTION:

Do not use a sharp instrument to avoid damaging or scratching the surfaces.

2. Inspect:
   - YPVS valve assembly
     Crack/damage/wear → Replace.

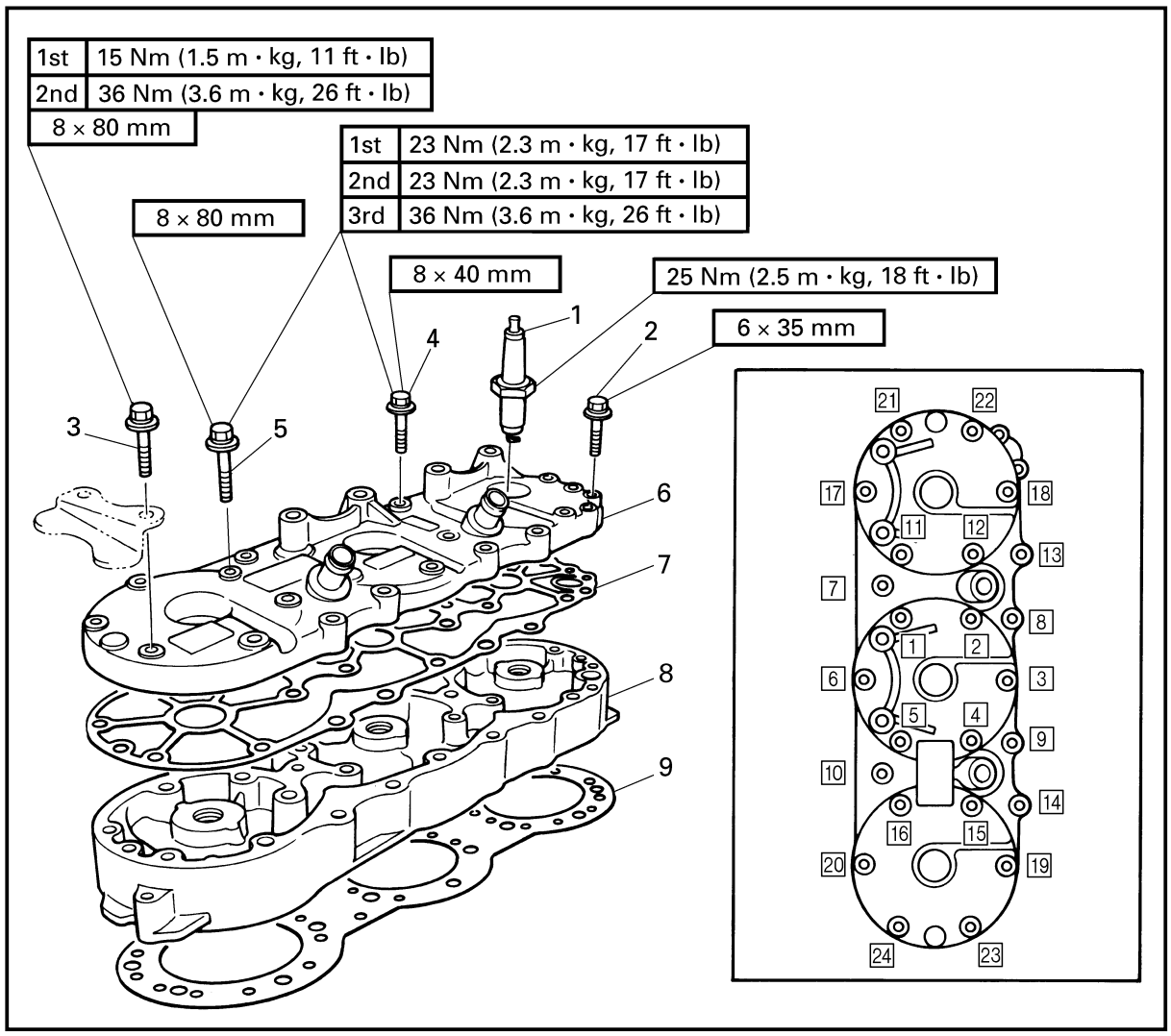
CYLINDER HEAD
EXPLODED DIAGRAM



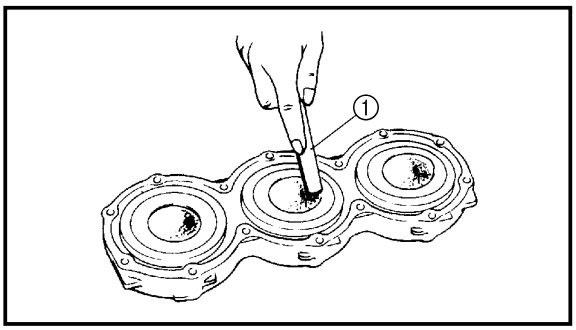
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CYLINDER HEAD REMOVAL		Follow the left "Step" for removal.
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY".
1	Spark plug	3	
2	Bolt	2	**NOTE:**
3	Bolt	2	Tighten the bolts in the proper sequence
4	Bolt	6	as shown and in three stages. (No. 23, 24
5	Bolt	16	in two stages)

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
6	Cylinder head cover	1	
7	Gasket	1	**Not reusable**
8	Cylinder head	1	
9	Gasket	1	**Not reusable**
			Reverse the removal steps for installation.



SERVICE POINTS

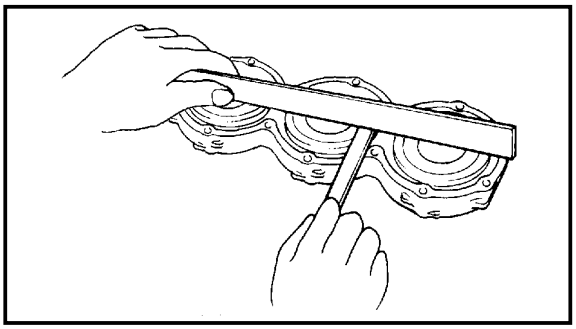
Cylinder head inspection

1. Eliminate:
   - Carbon deposits
     (with a rounded scraper ①)

CAUTION:

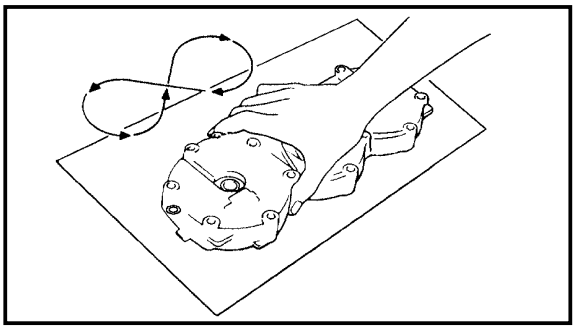
Do not use a sharp instrument to avoid damaging or scratching the cylinder head or spark plug bore threads.

2. Inspect:
   - Cylinder head water jacket
     Corrosion/mineral deposits → Clean or replace.



3. Measure:
   - Cylinder head warpage
     (with a straightedge and thickness gauge)
     Out of specification/score marks → Resurface.

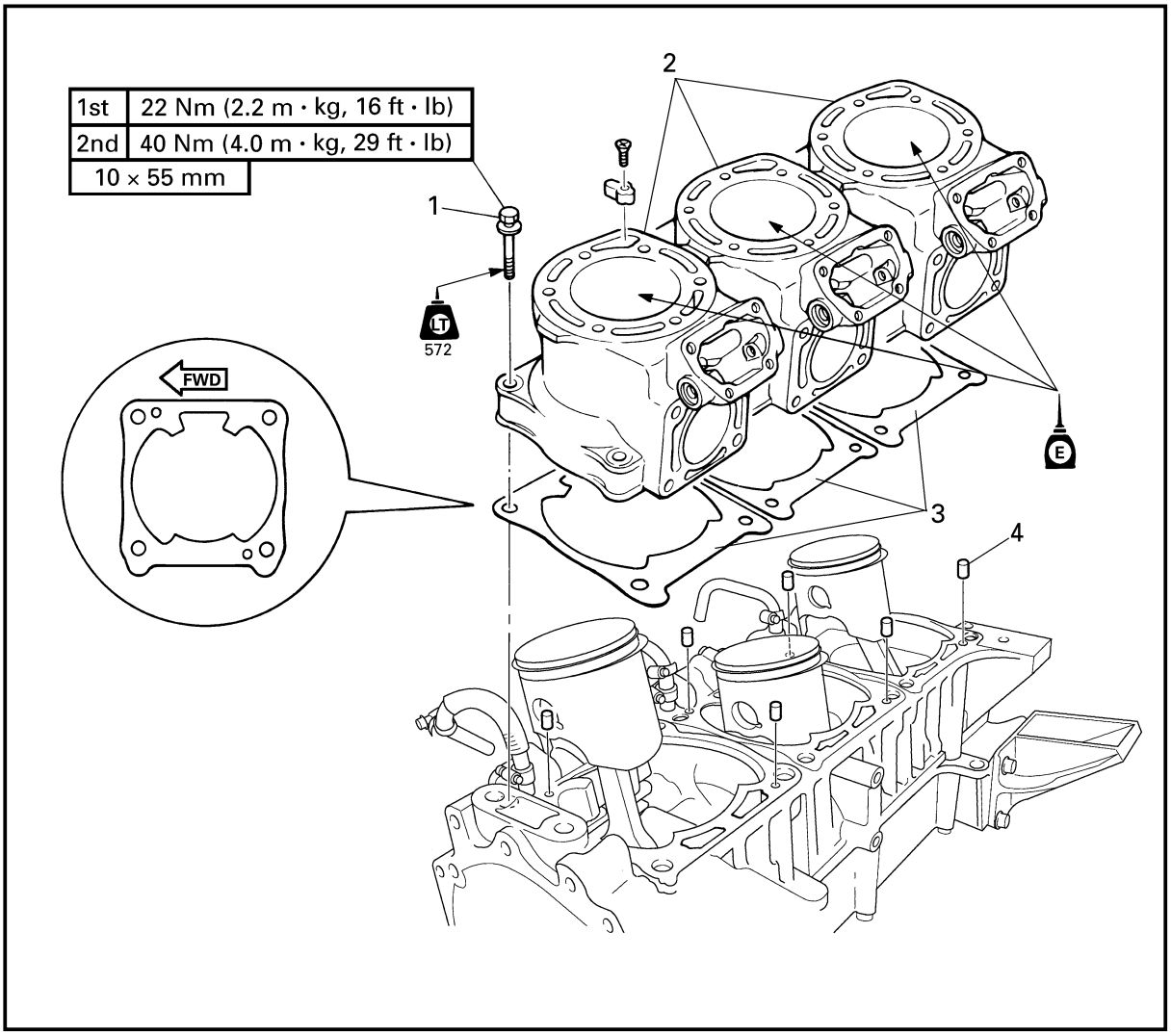
Warpage limit:
0.1 mm (0.004 in)



NOTE:

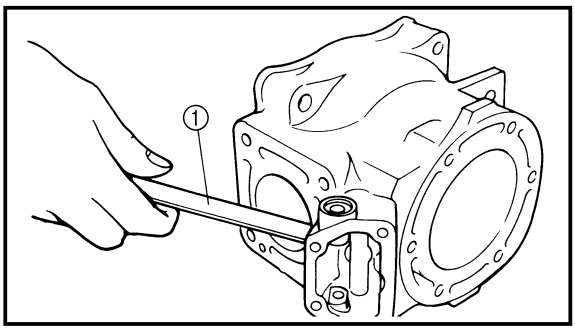
Place a 400 ~ 600 grit wet sandpaper on a surface plate and resurface the cylinder head using a figure-eight sanding pattern.

CYLINDERS
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CYLINDER REMOVAL		Follow the left "Step" for removal.
	YPVS		Refer to "YPVS".
	Cylinder head		Refer to "CYLINDER HEAD".
1	Bolt	12	**NOTE:** Tighten the bolts in a crisscross pattern and in two stages.
2	Cylinder	3	**NOTE:** Install the original position.
3	Cylinder gasket	3	**Not reusable**
4	Pin	6	
			Reverse the removal steps for installation.

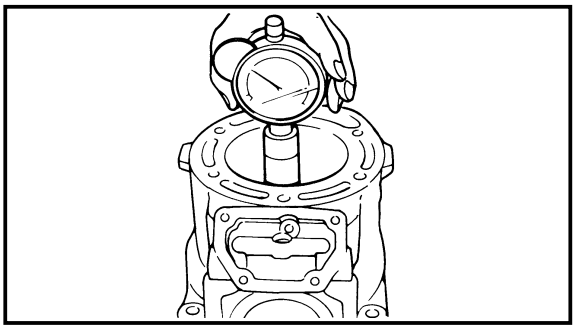


SERVICE POINTS

Cylinder inspection

1. Eliminate:
   - Carbon deposits
     (with a rounded scraper ①)

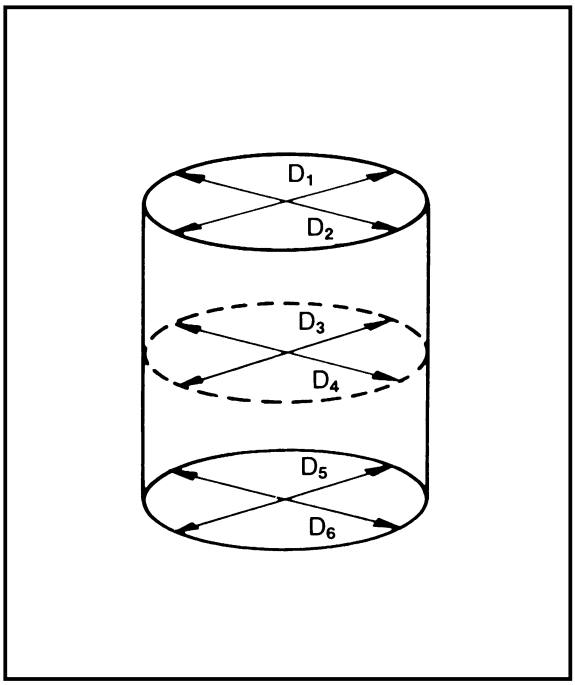
2. Inspect:
   - Cylinder water jacket
     Corrosion/mineral deposits → Clean or replace.
   - Cylinder inner surface
     Score marks → Replace.



3. Measure:
   - Cylinder bore "D"
     (with a cylinder gauge)
     Out of specification → Replace cylinder and piston as a set.

NOTE:

Measure the cylinder bore in parallel and at a right angle to the crankshaft. Then, average the measurements.

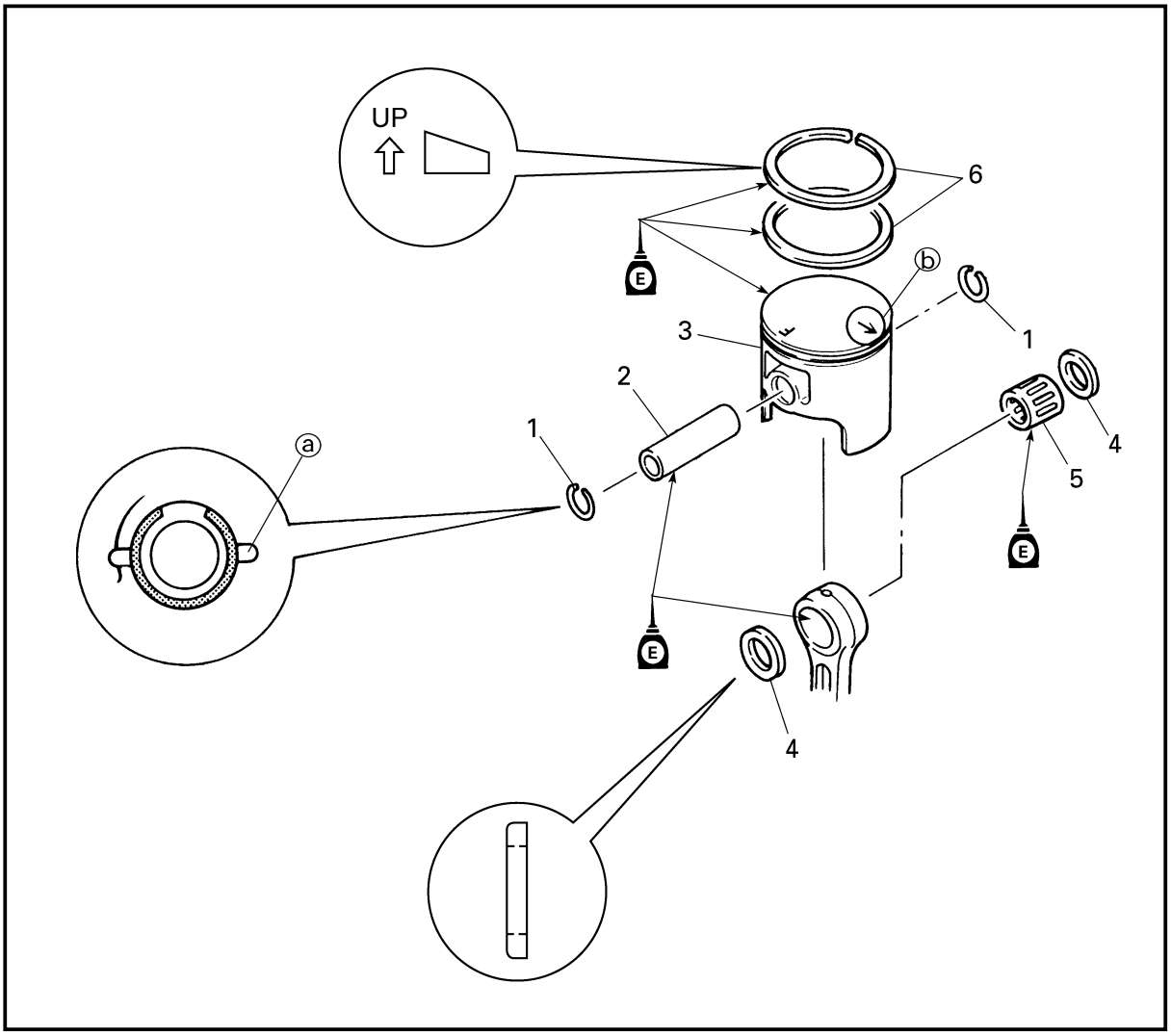


	Standard	Limit
Cylinder bore "D"	80.000 ~ 80.018 mm (3.1496 ~ 3.1503 in)	Original cylinder bore + 0.04 mm (0.0016 in)
Taper "T"	—	0.08 mm (0.003 in)
Out of round "R"	—	0.05 mm (0.002 in)

D = Maximum (D_1 ~ D_6)
T = (Maximum D_1 or D_2) – (Maximum D_5 or D_6)
R = (Maximum D_1, D_3 or D_5) – (Minimum D_2, D_4 or D_6)

PISTONS

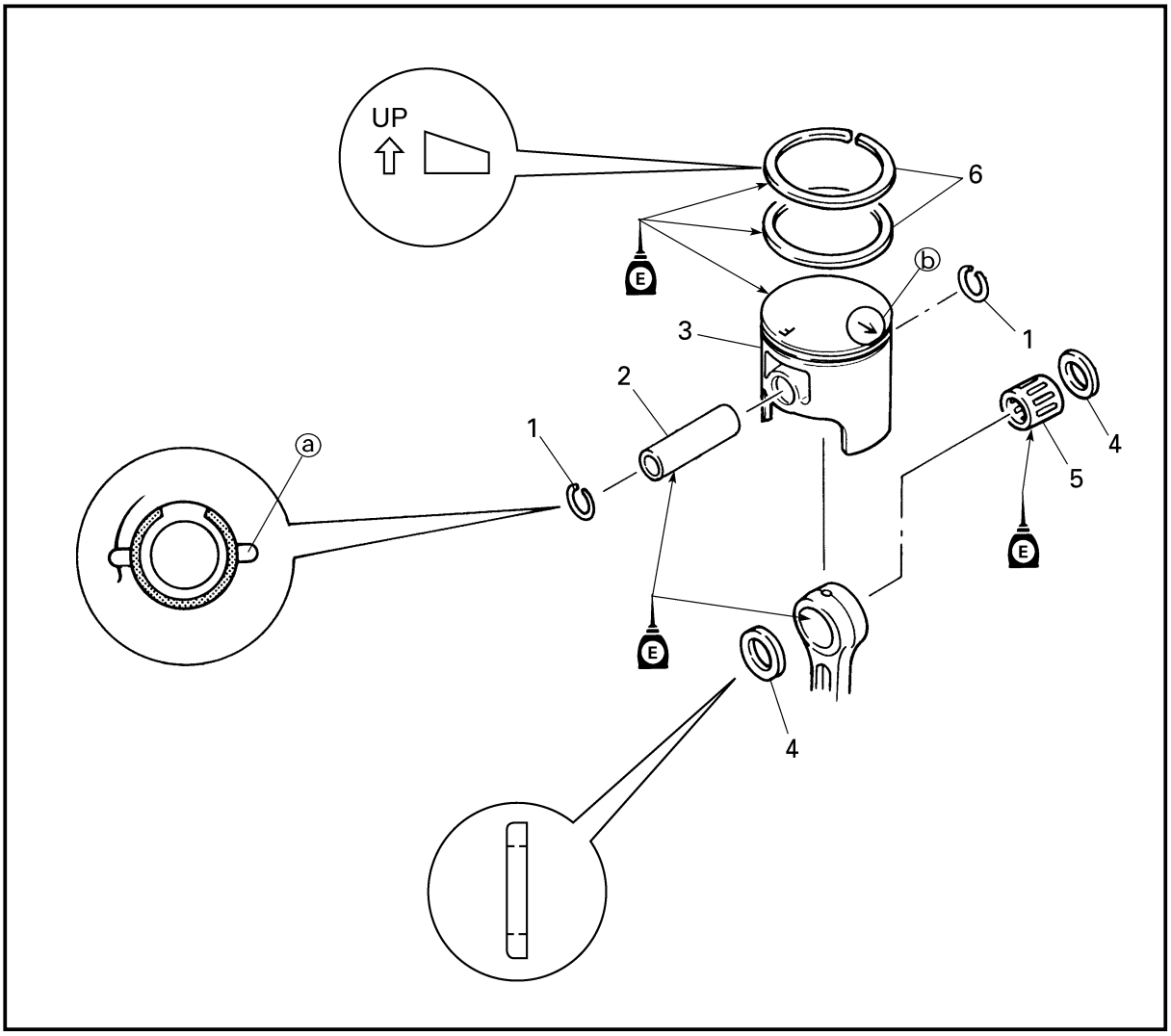
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	PISTON REMOVAL		Follow the left "Step" for removal.
	Cylinders		Refer to "CYLINDERS".
1	Piston pin clip	6	**CAUTION:** **Do not align the open end of the clip with the piston pin slot ⓐ.**
2	Piston pin	3	
3	Piston	3	**NOTE:** Make sure that the arrow ⓑ faces towards the exhaust side.
4	Washer	6	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
5	Bearing	3	
6	Piston ring	6	**CAUTION:** **Align each end gap with its respective locating pin.** Reverse the removal steps for installation.

SERVICE POINTS

Piston pin clip removal and installation

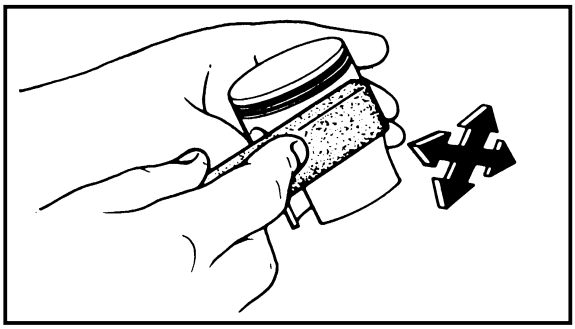
1. Remove and install:
   - Piston pin clip

NOTE:

Before removing or installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.

Piston inspection

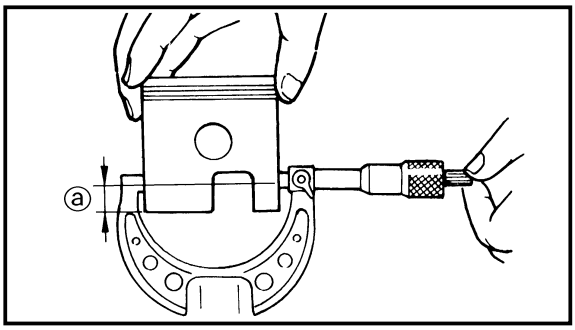
1. Eliminate:
   - Carbon deposits
     (from the piston crown and piston ring grooves)



2. Inspect:
   - Piston wall
     Score marks → Repair with 600 ~ 800 grit wet sandpaper or replace.

NOTE:

Lightly sand the piston wall in a crisscross pattern.



3. Measure:
   - Piston skirt diameter
     (with a micrometer)
     Out of specification → Replace.

	Piston diameter	Distance ⓐ
	79.899 ~ 79.914 mm (3.1456 ~ 3.1462 in)	22 mm (0.87 in)

4. Calculate:
   - Piston-to-cylinder clearance
     Out of specification → Replace the piston, piston rings and cylinder as a set.

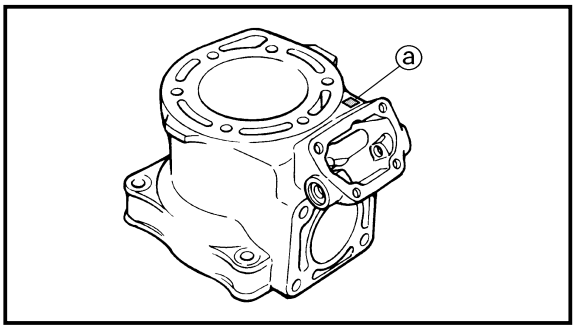
PISTON CLEARANCE	=	CYLINDER BORE	–	PISTON DIAMETER

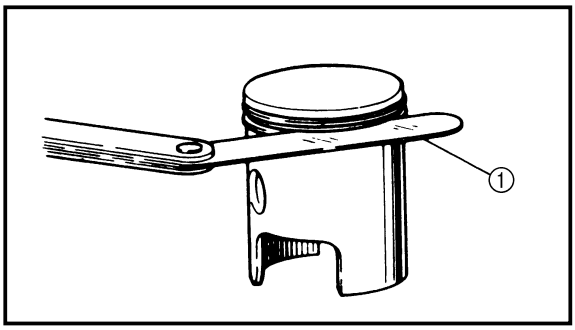
Piston-to-cylinder clearance:
0.100 ~ 0.105 mm
(0.0039 ~ 0.0041 in)

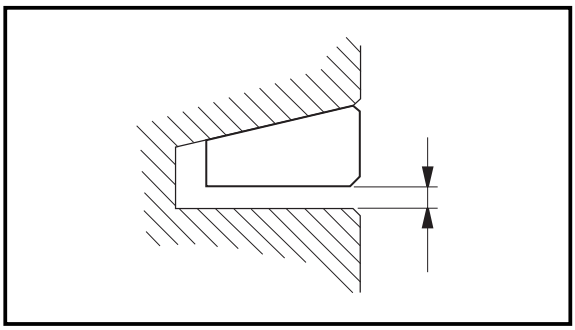
Cylinder and piston combination
Select the appropriate piston to match the cylinder size by the table as follows.

Cylinder size indication ⓐ	Piston color mark
0 ~ 5	Red
6 ~ 10	Orange
11 ~ 15	Green
16 ~ 18	Purple

NOTE:
New cylinder bore size = 80.000 + ⓐ/1,000
Example: ⓐ = 12 → 80.012 mm.

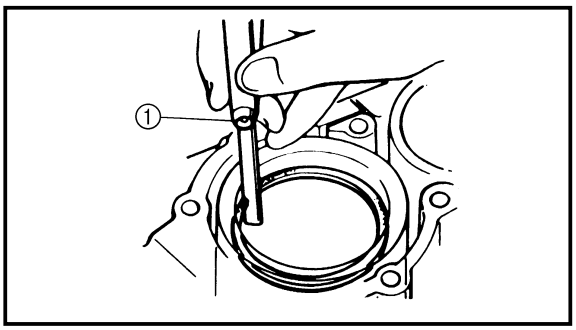






Piston ring inspection
1. Measure:
   - Side clearance
     (with a thickness gauge ①)
     Out of specification → Replace the piston and piston rings as a set.

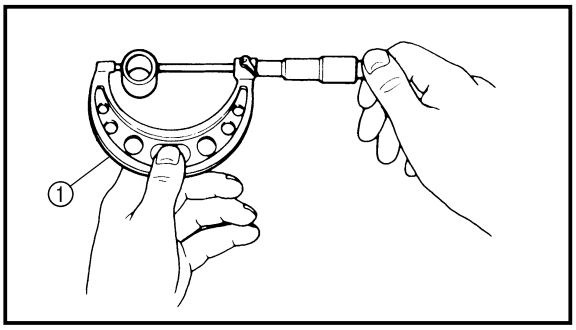
Side clearance:
0.02 ~ 0.07 mm (0.001 ~ 0.003 in)



2. Measure:
   - End gap
     (with a thickness gauge ①)
     Out of specification → Replace the piston rings as a set.

End gap:
0.45 ~ 0.60 mm (0.018 ~ 0.024 in)

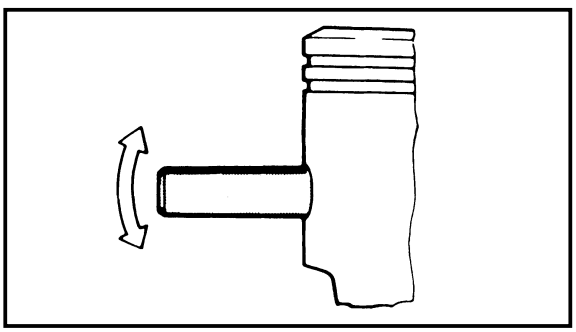
NOTE:
Push the piston ring into the cylinder with the piston crown.



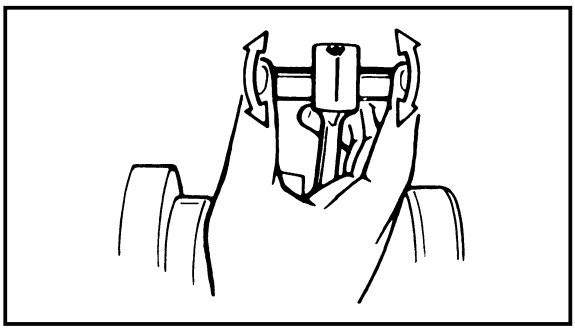
Piston pin and bearing inspection

1. Inspect:
   - Piston pins
   - Bearings
     Signs of heat discoloration → Replace.
2. Measure:
   - Piston pin outside diameter
     (with a micrometer ①)
     Out of specification → Replace.

Piston pin outside diameter:
Standard
21.995 ~ 22.000 mm
(0.8659 ~ 0.8661 in)
Limit
21.990 mm (0.8657 in)

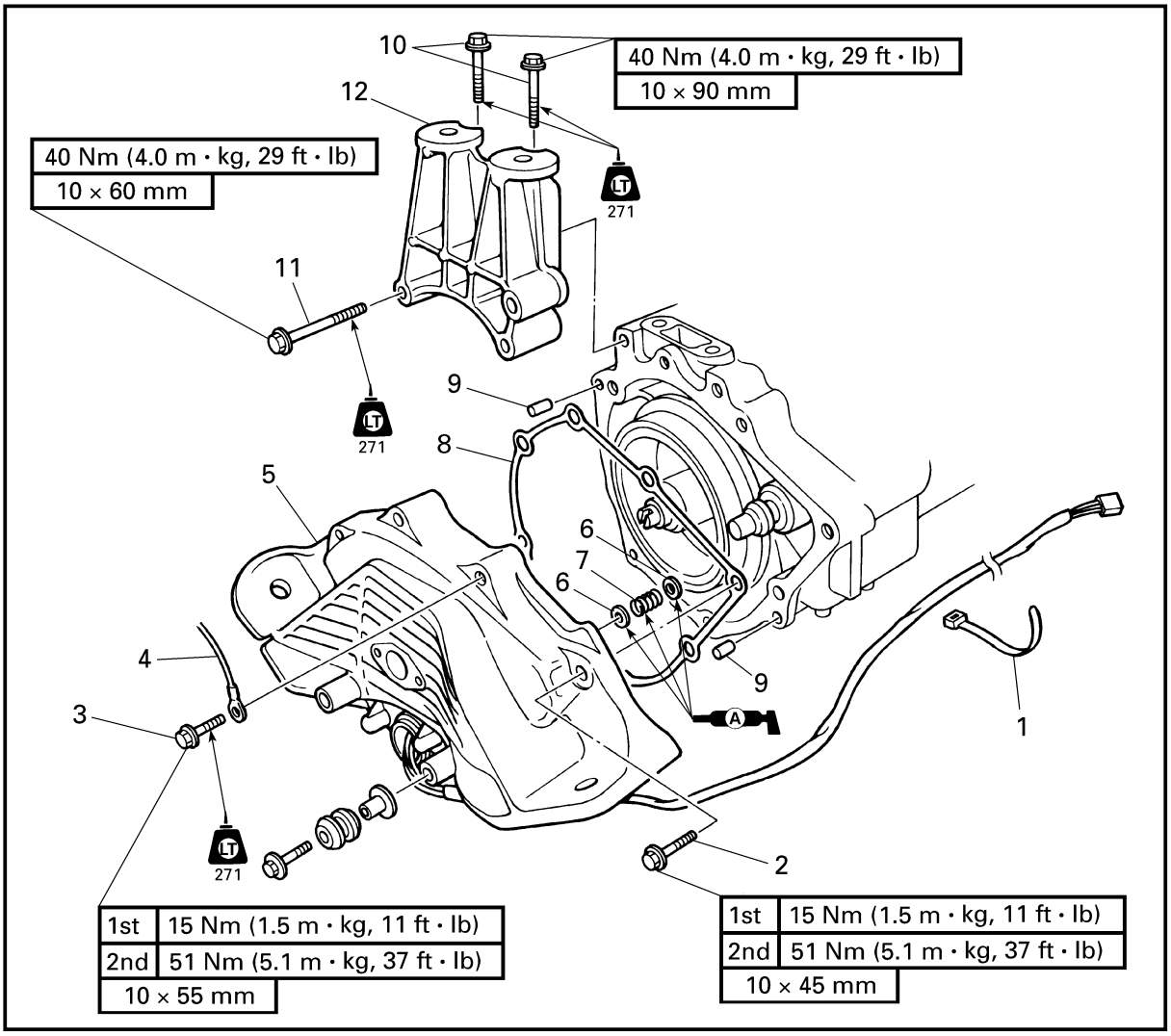


3. Check:
   - Piston-pin-to-piston free play
     (with the piston pin in the piston as shown)
     Free play → Replace the piston pin, piston or both.



4. Check:
   - Piston-pin-to-connecting-rod free play (with the piston pin in the small end of the connecting rod as shown)
     Free play/small end wear → Replace the piston pin, connecting rod or both.

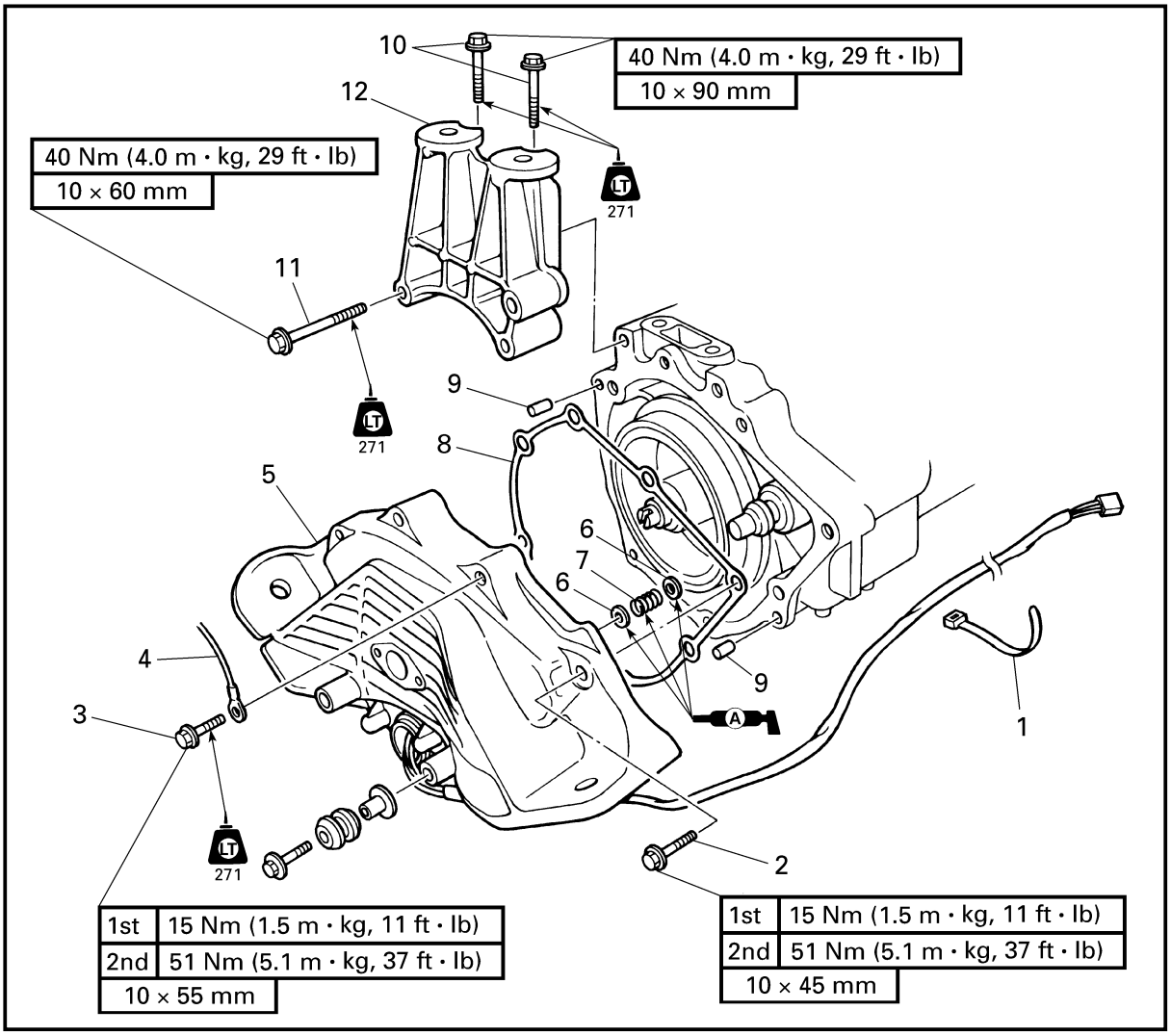
GENERATOR AND STARTER MOTOR
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

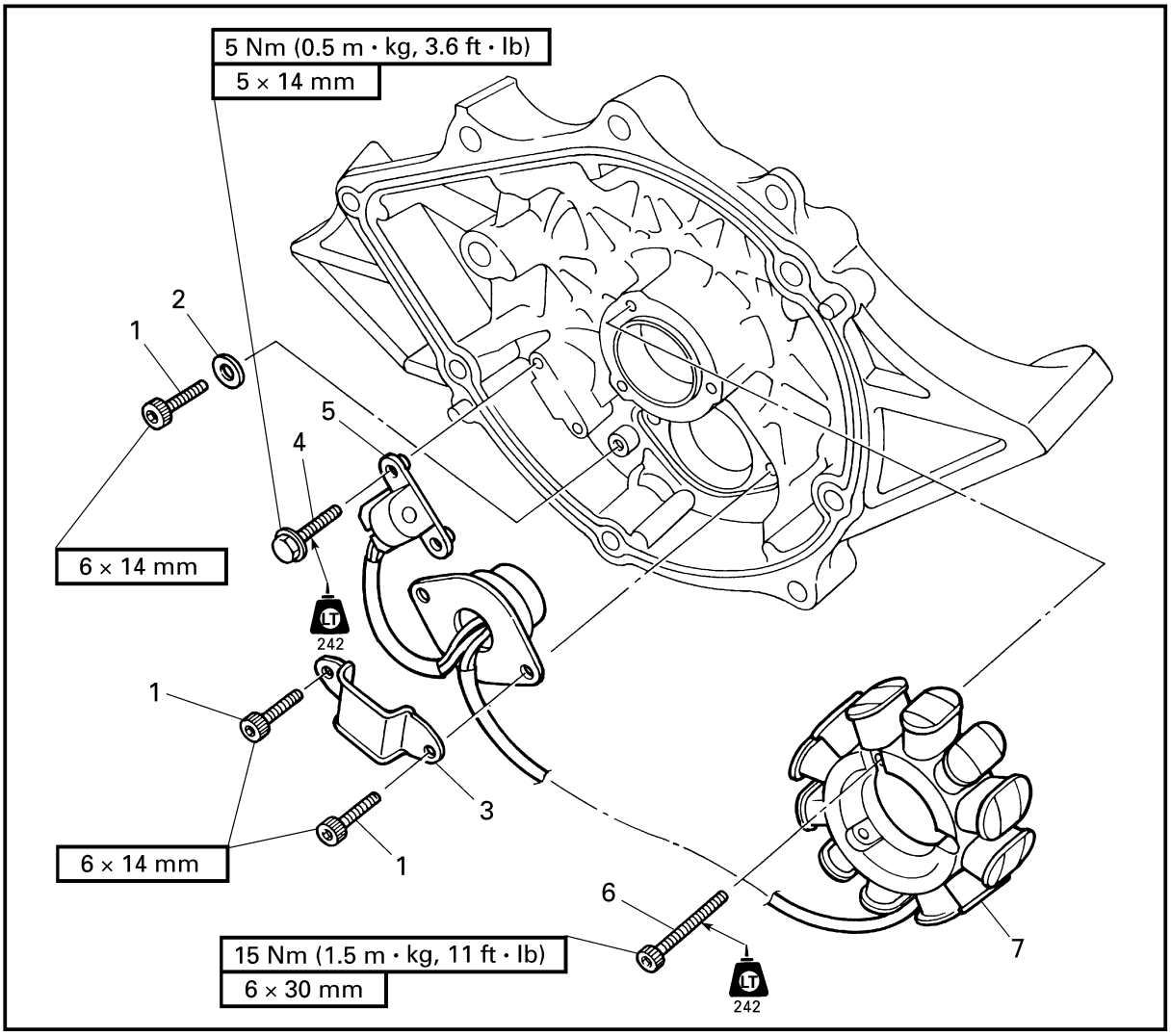
Step	Procedure/Part name	Q'ty	Service points
	GENERATOR COVER REMOVAL		Follow the left "Step" for removal.
	Engine unit		Refer to "ENGINE UNIT".
	Oil pump		Refer to "OIL PUMP" in chapter 4.
1	Band	1	
2	Bolt	1	
3	Bolt	7	
4	Ground lead	1	
5	Generator cover	1	
6	Washer	2	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Spring	1	
8	Packing	1	
9	Pin	2	
10	Bolt	2	
11	Bolt	2	
12	Bracket	1	
			Reverse the removal steps for installation.

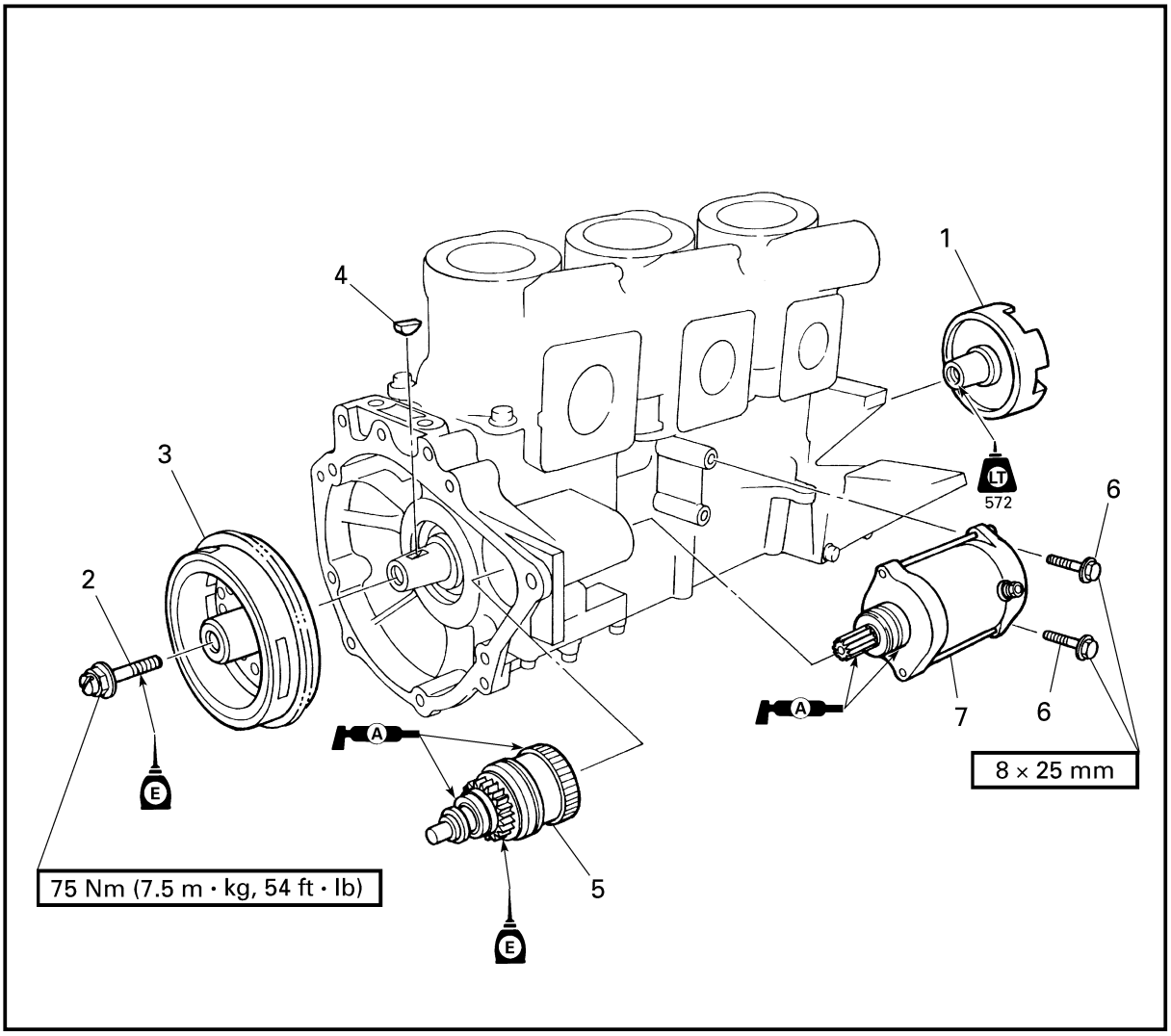
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	STATOR COIL AND PICKUP COIL REMOVAL		Follow the left "Step" for removal.
1	Bolt	3	**NOTE:**
2	Washer	1	This washer holds the pickup coil lead. Make sure to not pinch the lead between the projection and the washer when installing the bolt.
3	Cable holder	1	
4	Bolt	2	
5	Pickup coil	1	
6	Bolt	3	
7	Stator coil	1	
			Reverse the removal steps for installation.

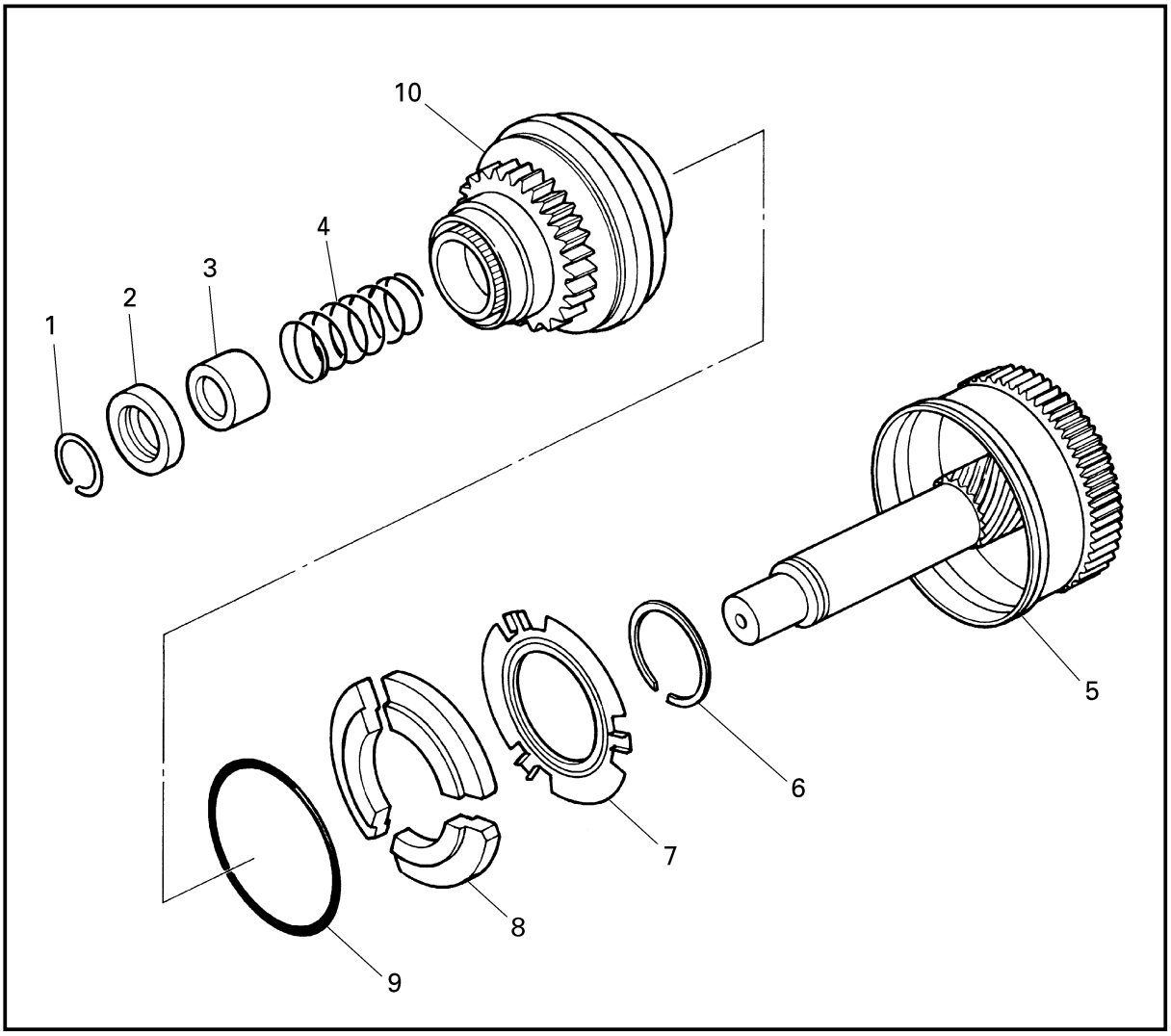
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	GENERATOR ROTOR AND STARTER MOTOR REMOVAL		Follow the left "Step" for removal.
1	Drive coupling	1	
2	Flywheel magneto bolt	1	
3	Flywheel magneto	1	
4	Woodruff key	1	
5	Starter clutch assembly	1	
6	Bolt	2	
7	Starter motor	1	
			Reverse the removal steps for installation.

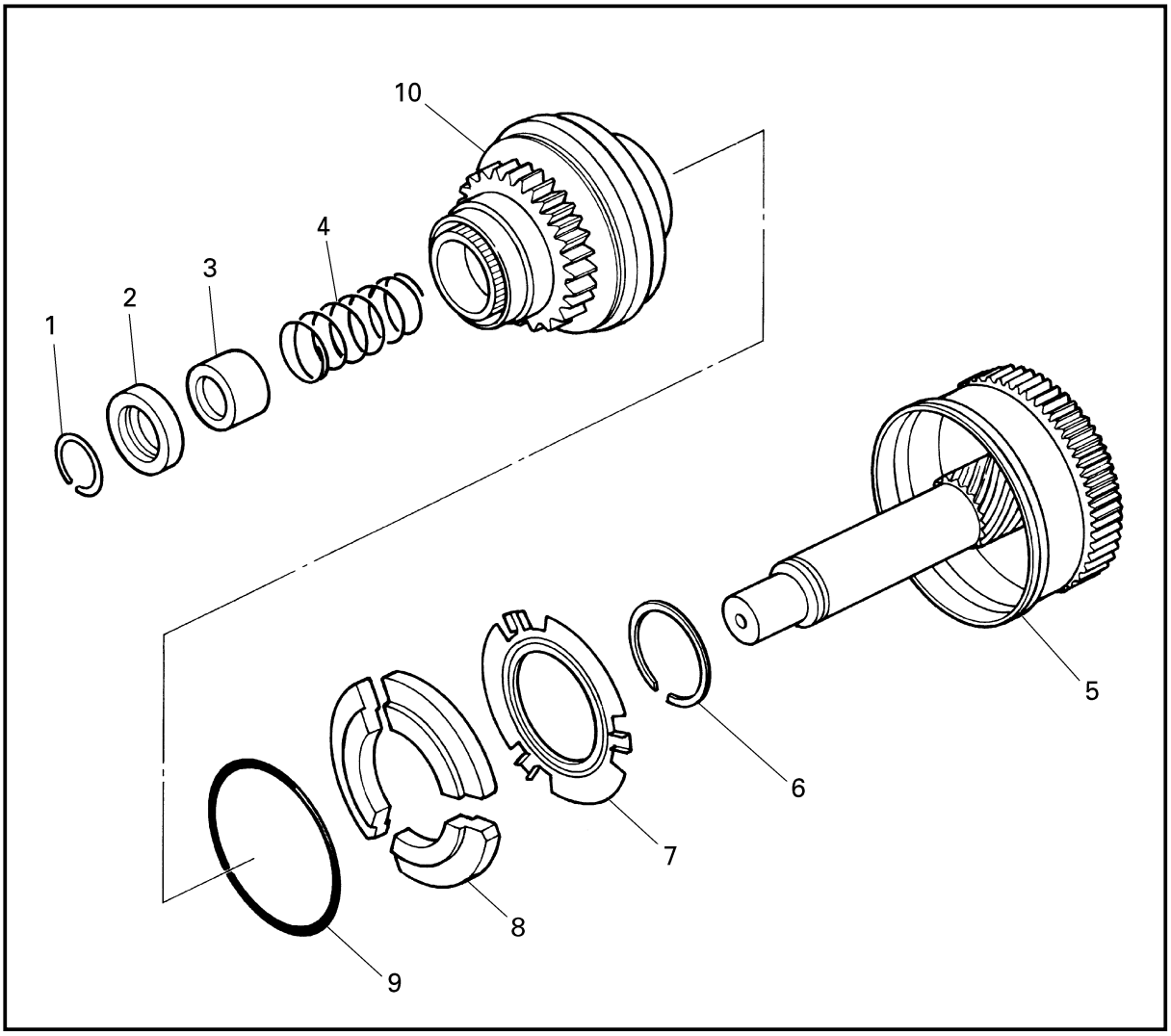
EXPLODED DIAGRAM



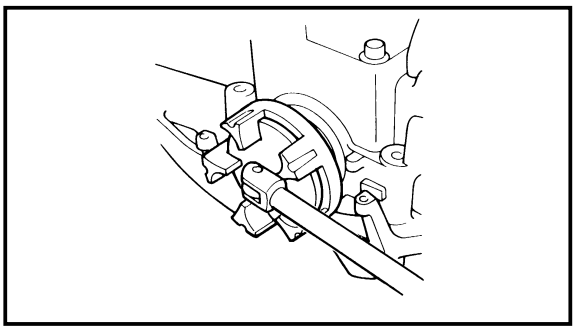
REMOVAL AND INSTALLATION CHART

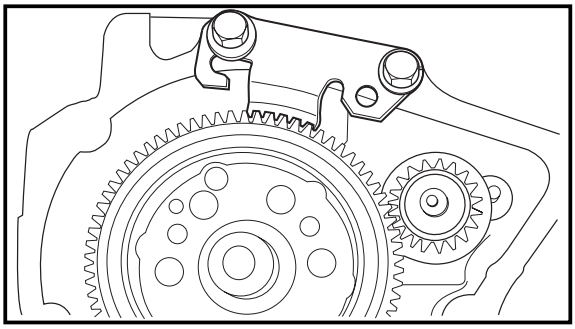
Step	Procedure/Part name	Q'ty	Service points
	STARTER CLUTCH DISASSEMBLY		Follow the left "Step" for disassembly.
1	Clip	1	**Not reusable**
2	Clip stopper	1	
3	Spring seat	1	
4	Spring	1	
5	Idle gear	1	
6	Circlip	1	
7	Plate	1	

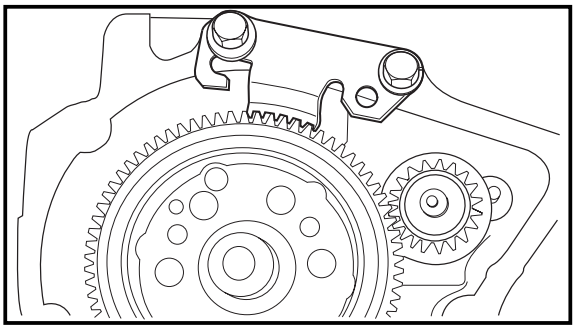
EXPLODED DIAGRAM



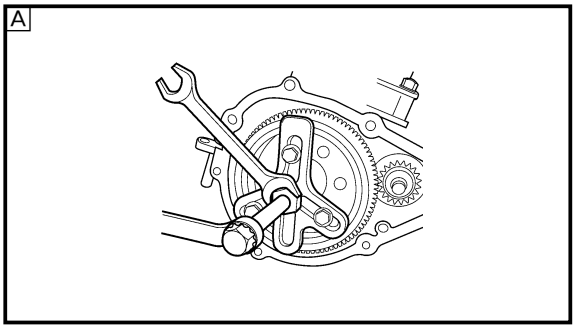
Step	Procedure/Part name	Q'ty	Service points
8	Weight	3	
9	Spring	1	
10	Pinion gear	1	
			Reverse the disassembly steps for assembly.



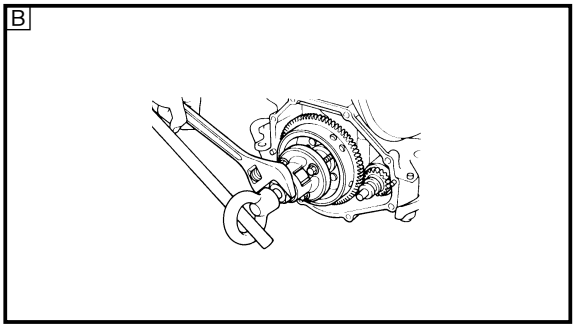




A



B



SERVICE POINTS

Drive coupling removal and installation

1. Remove:
   - Drive coupling

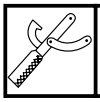
Coupler wrench:
YW-06551/90890-06551
Flywheel holder:
YW-06550/90890-06550

NOTE:

Install the drive coupling with the same special tools that were used for removal.

Flywheel magneto removal and installation

1. Remove:
   - Flywheel magneto bolt



Flywheel holder:
YW-06550/90890-06550

NOTE:

Install the bolt with the same special tool that was used for removal.

2. Remove:
   - Generator rotor

Flywheel puller:
YB-06117/90890-06521
Set bolt:
M8 × 60 mm

A For USA and CANADA
B For worldwide

CAUTION:

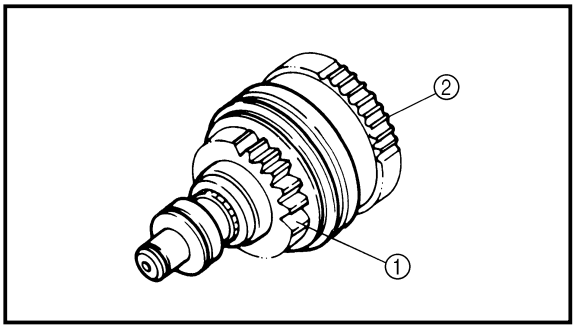
To prevent damage to the engine or tools, screw in the flywheel puller set bolts evenly and completely so that the puller plate is parallel to the generator rotor.

Drive coupling inspection

1. Inspect:
   - Drive coupling
     Damage/wear → Replace.

Flywheel magneto inspection

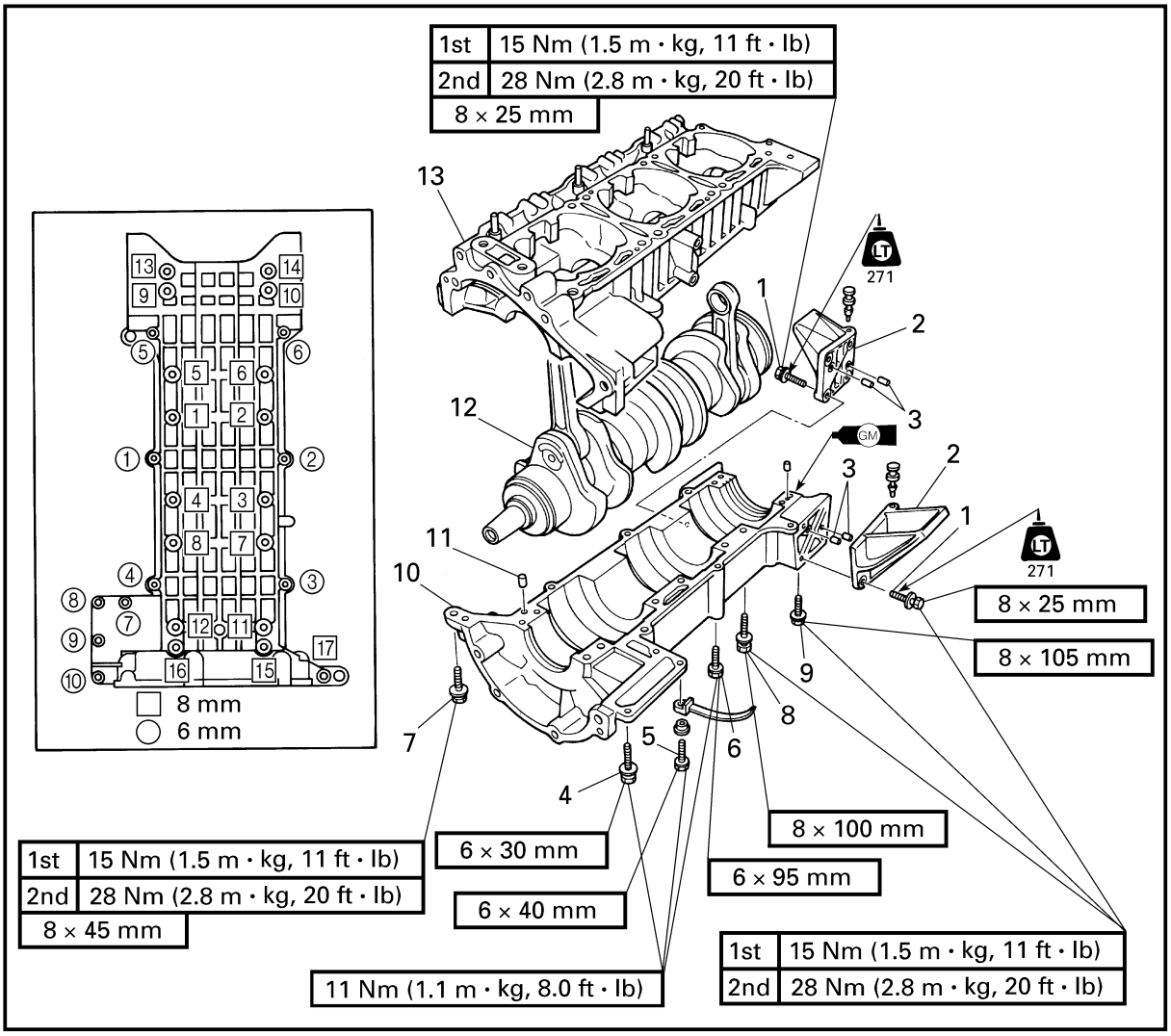
1. Inspect:
   - Ring gear
     Damage/wear → Replace.



Starter clutch assembly inspection

1. Inspect:
   - Pinion gear ①
   - Idle gear ②
     Damage/wear → Replace.
2. Check:
   - Gear movement
     Rough movement → Replace the defective part(s).

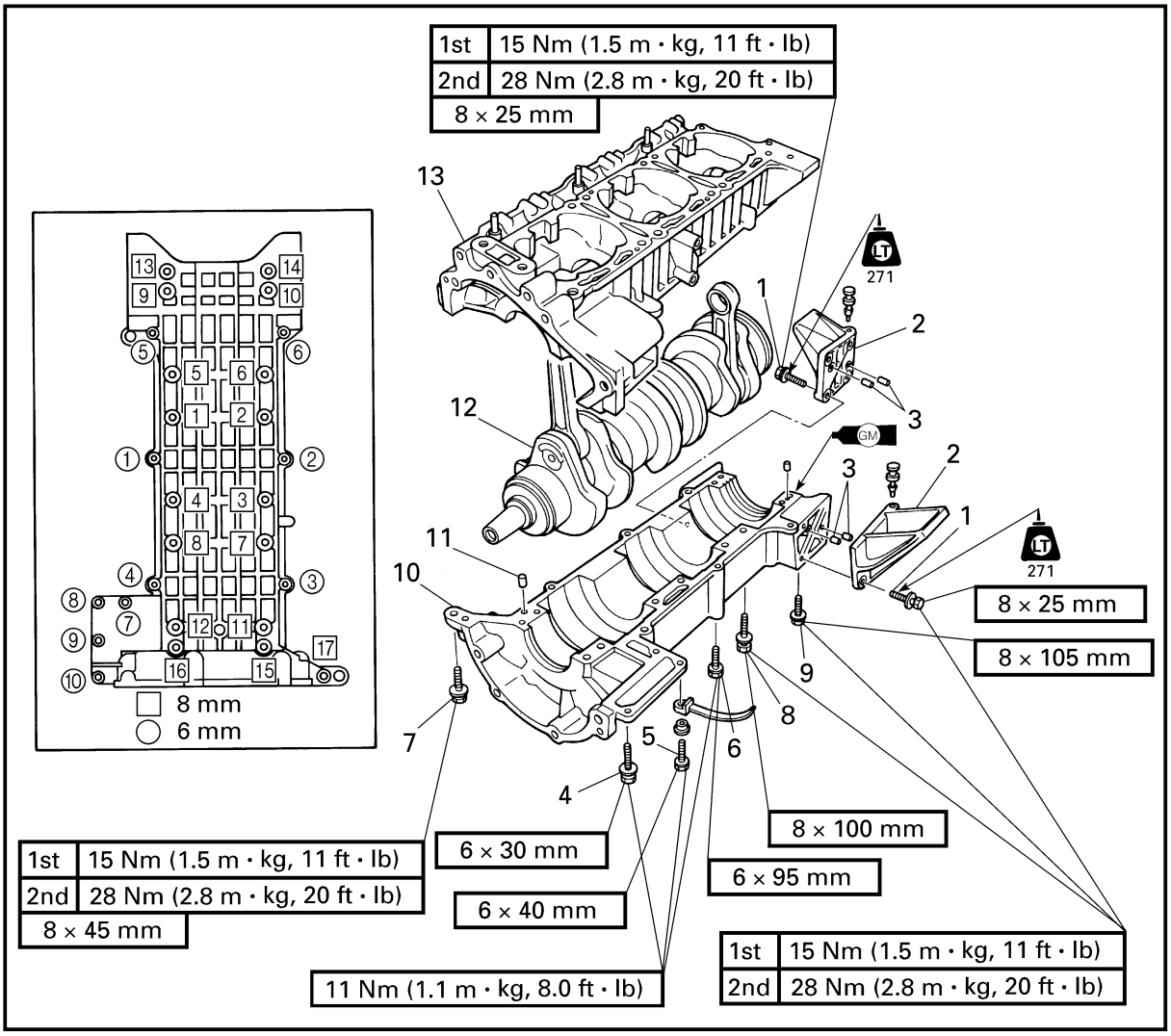
CRANKCASE
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CRANKCASE DISASSEMBLY		Follow the left "Step" for disassembly.
	Pistons		Refer to "PISTONS".
	Generator cover and starter motor		Refer to "GENERATOR AND STARTER MOTOR".
1	Bolt	6	
2	Mount bracket	2	
3	Pin	4	
4	Bolt	3	
5	Bolt	1	
6	Bolt	6	

EXPLODED DIAGRAM

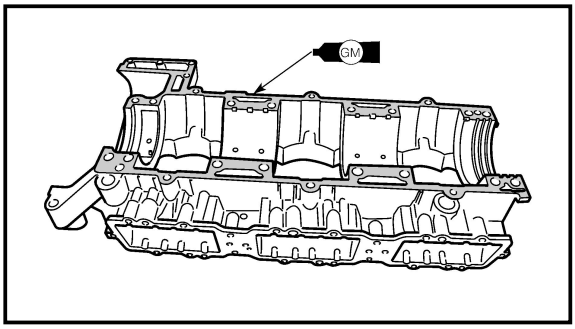


Step	Procedure/Part name	Q'ty	Service points
7	Bolt	1	**NOTE:**
8	Bolt	12	Tighten the bolts in sequence as shown.
9	Bolt	4	
10	Lower crankcase	1	
11	Pin	2	
12	Crankshaft assembly	1	
13	Upper crankcase	1	
			Reverse the disassembly steps for assembly.

SERVICE POINTS

Crankcase inspection

1. Inspect:
   - Mating surfaces
     Scratches → Replace the crankcase.
   - Crankcase
     Cracks/damage → Replace.



Crankcase installation

1. Apply:
   - Gasket Maker®
     (onto the crankcase mating surfaces)

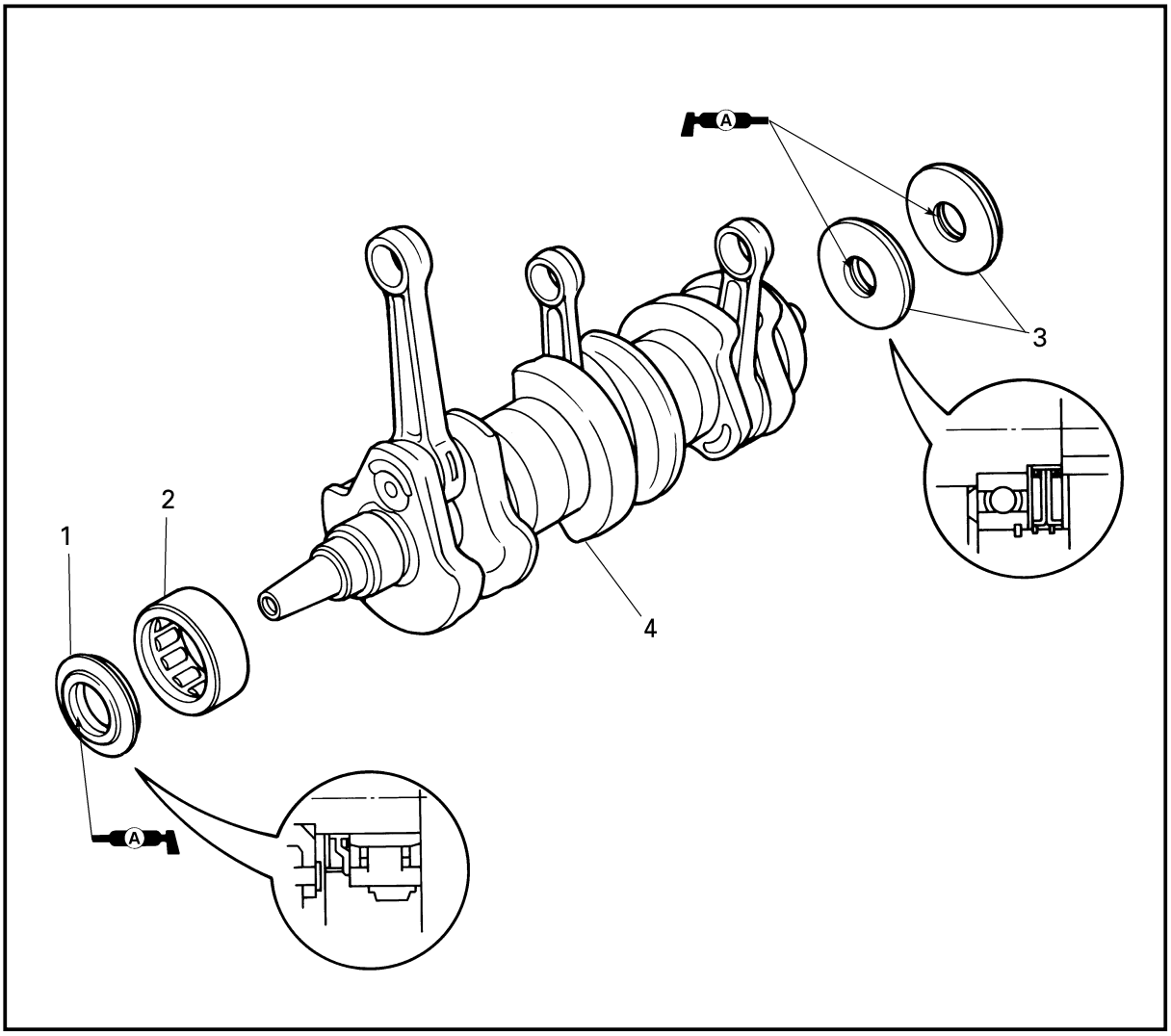
NOTE:
Before applying Gasket Maker®, clean the crankcase mating surfaces.

2. Check:
   - Crankshaft
     Rough movement → Recheck.

NOTE:
After installation, make sure that the crankshaft rotates smoothly.

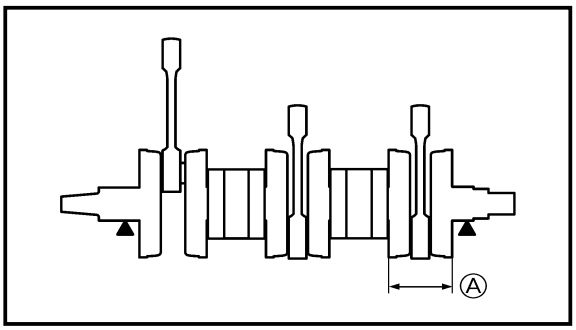
CRANKSHAFT

EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	CRANKSHAFT REMOVAL		Follow the left "Step" for removal.
	Crankcase		Refer to "CRANKCASE".
1	Oil seal	1	
2	Bearing	1	
3	Oil seal	2	
4	Crankshaft assembly	1	**CAUTION:** **Install the bearing locating pins into the grooves in the crankcase body.**
			Reverse the removal steps for installation.



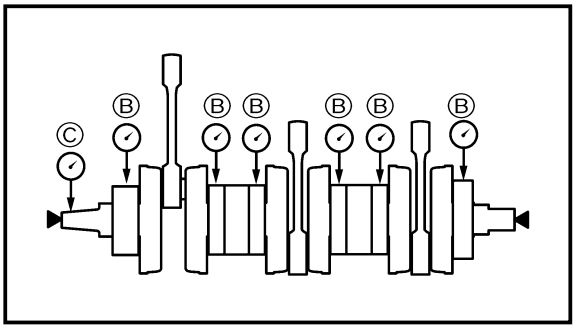
SERVICE POINTS

Crankshaft inspection

1. Measure:
   - Crank width Ⓐ

   Out of specification → Replace.

Crank width:
72.95 ~ 73.00 mm
(2.872 ~ 2.835 in)

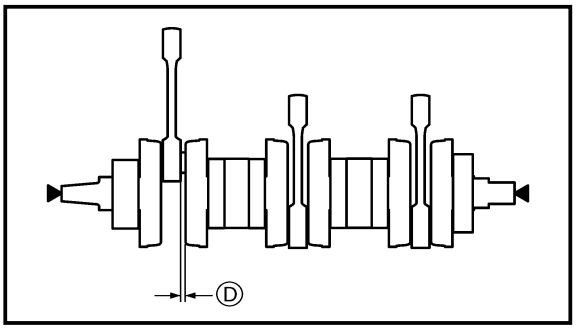


2. Measure:
   - Deflection Ⓑ

   (with a dial gauge)

   Out of specification → Replace.

Max. deflection:
Ⓑ 0.05 mm (0.002 in)
Ⓒ 0.15 mm (0.006 in)

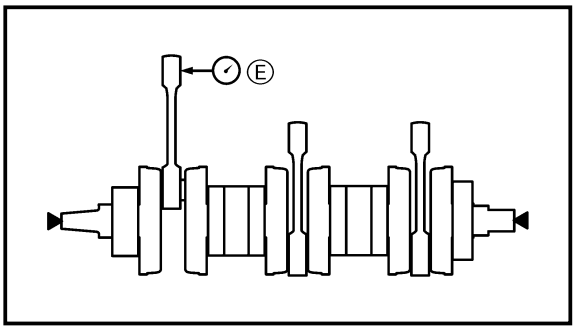


3. Measure:
   - Big end side clearance Ⓓ

   (with a thickness gauge)

   Out of specification → Replace.

Big end side clearance:
0.25 ~ 0.75 mm (0.010 ~ 0.030 in)

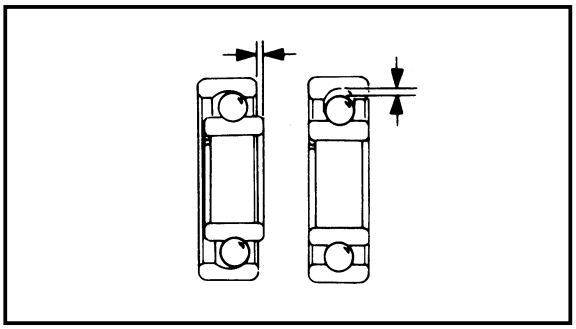


4. Measure:
   - Small end free play Ⓔ

   (with a dial gauge)

   Out of specification → Replace.

Small end free play:
2.0 mm (0.08 in)



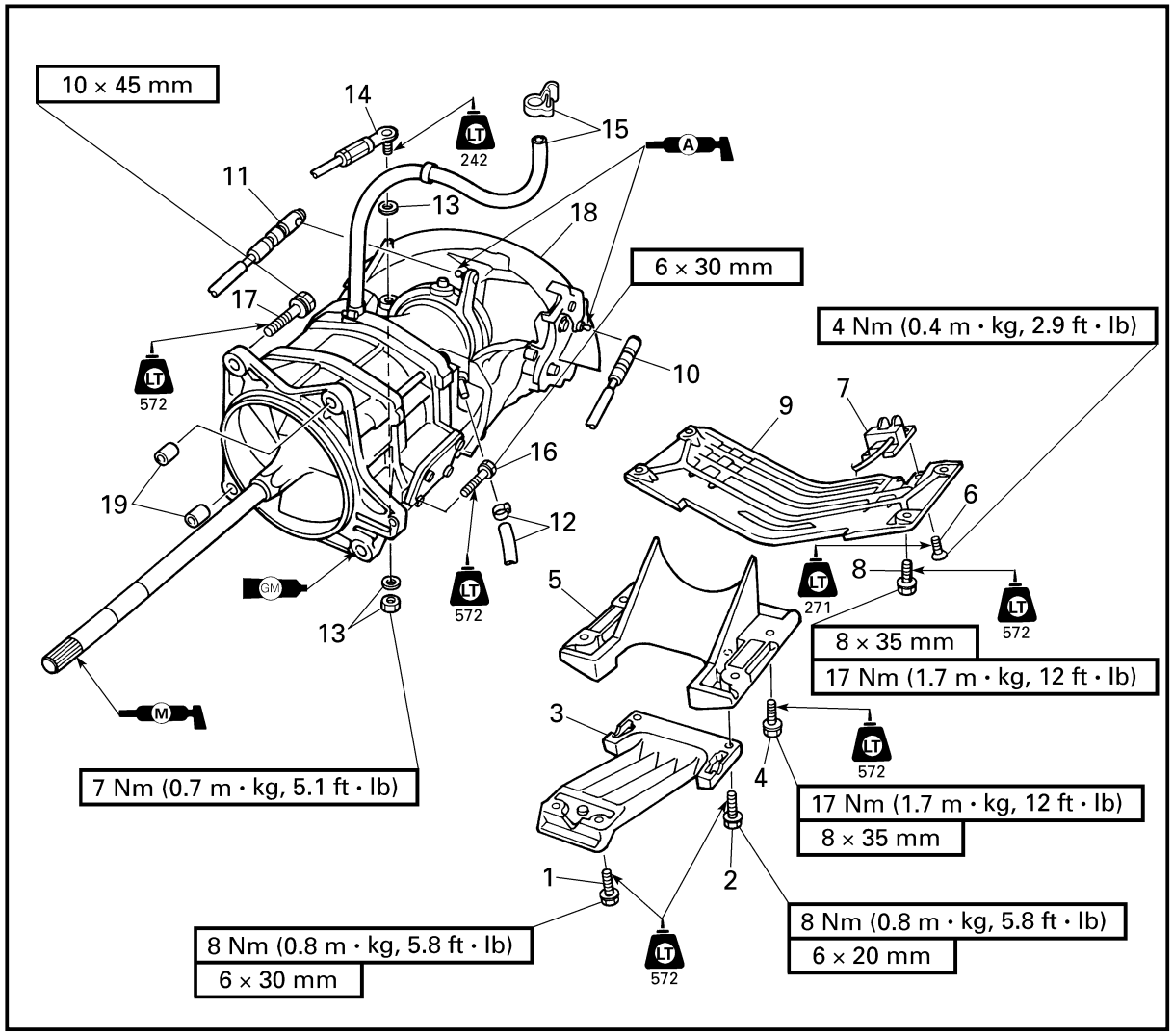
5. Inspect:
   - Bearings
     Damage/pitting → Replace.

NOTE:
- Before inspection, thoroughly clean the bearings.
- Immediately after inspection, lubricate the bearings to prevent rust.

6. Inspect:
   - Oil seals
     Damage/wear → Replace.

CHAPTER 6
JET PUMP UNIT

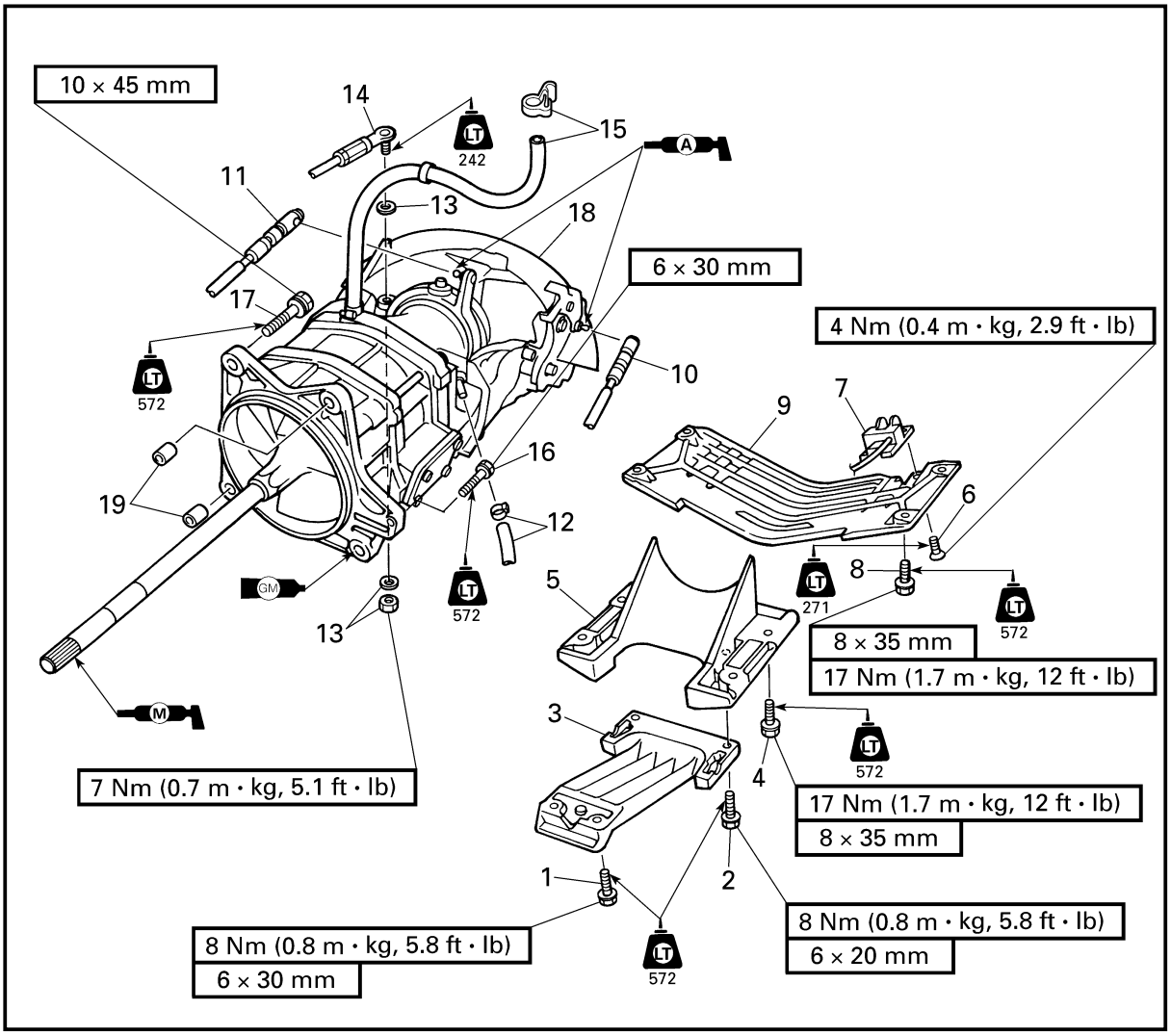
JET PUMP UNIT
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	JET PUMP UNIT REMOVAL		Follow the left "Step" for removal.
1	Bolt	2	
2	Bolt	2	
3	Intake screen	1	
4	Bolt	4	
5	Intake duct	1	
6	Screw	4	
7	Speed sensor	1	
8	Bolt	4	
9	Jet pump cover	1	
10	Shift cable joint	1	
11	QSTS cable joint	1	

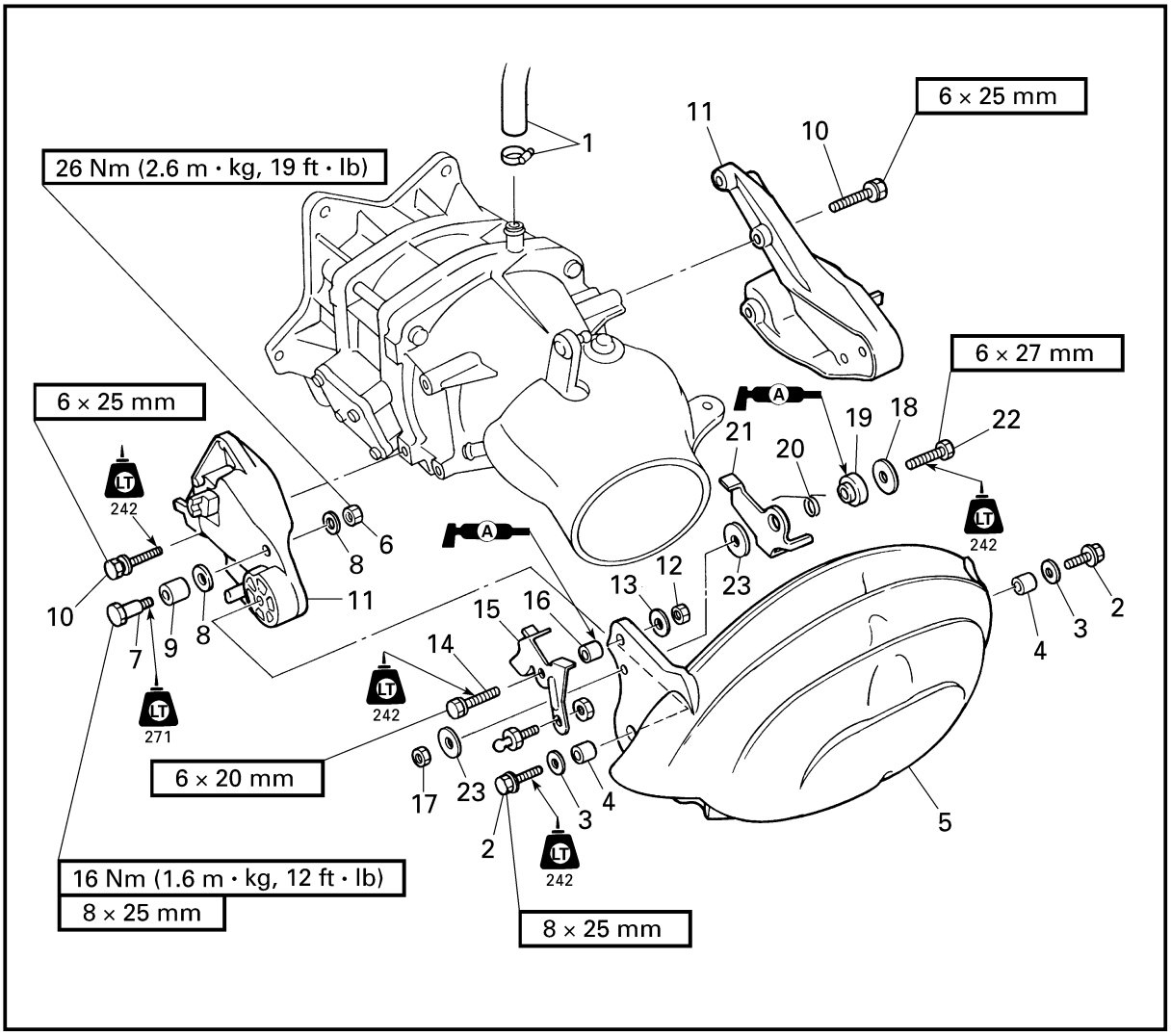
EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
12	Clamp/bilge hose	1/1	
13	Nut/washer	1/2	
14	Steering cable joint	1	
15	Clamp/spout hose	1/1	
16	Bolt	1	
17	Bolt	4	
18	Jet pump unit assembly	1	**NOTE:** ● Pull the jet pump unit straight back. ● When installing the jet pump unit, align the drive shaft spline (male) with the intermediate shaft spline (female). Reverse the removal steps for installation.
19	Dowel pin	2	

REVERSE GATE

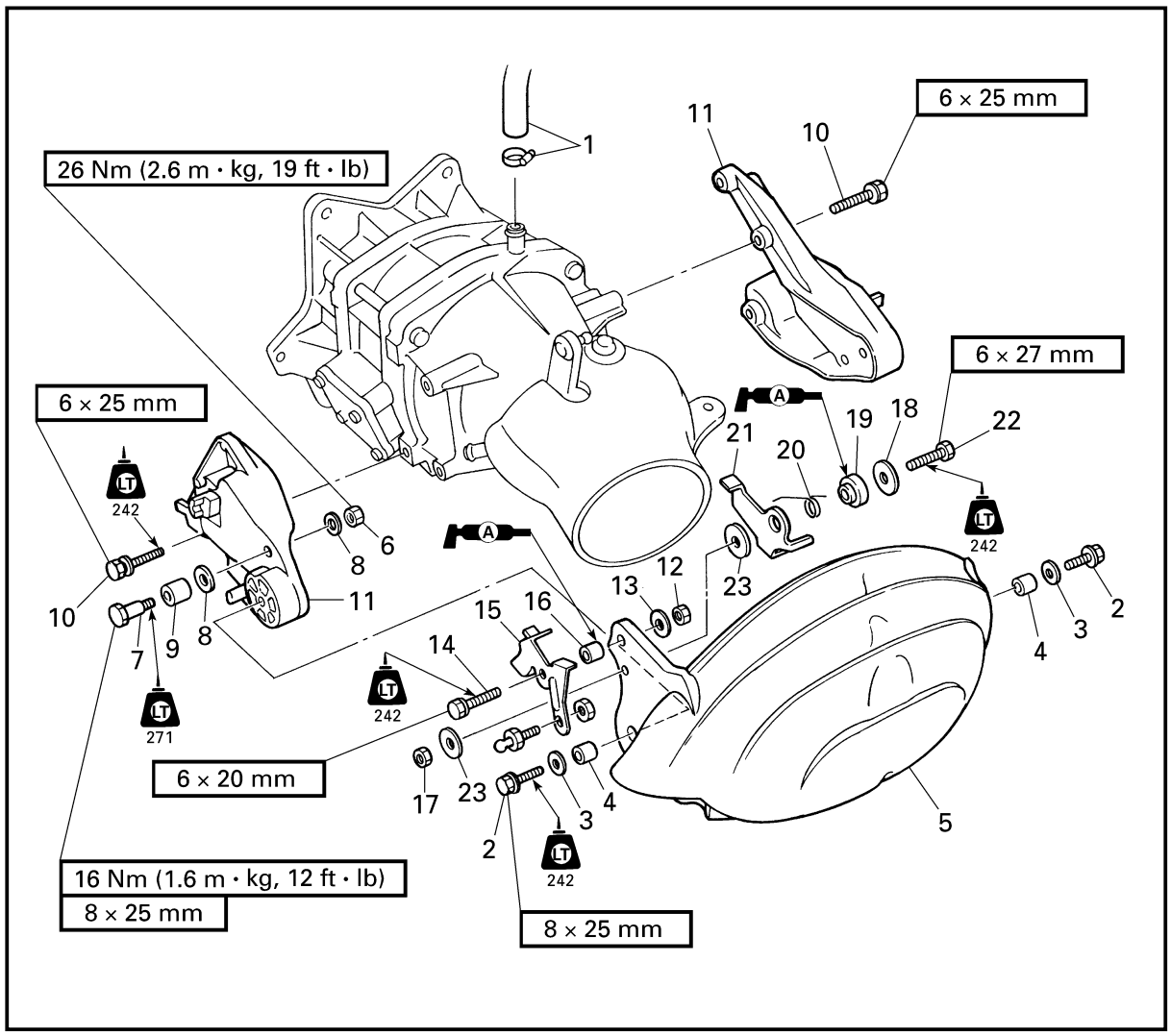
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

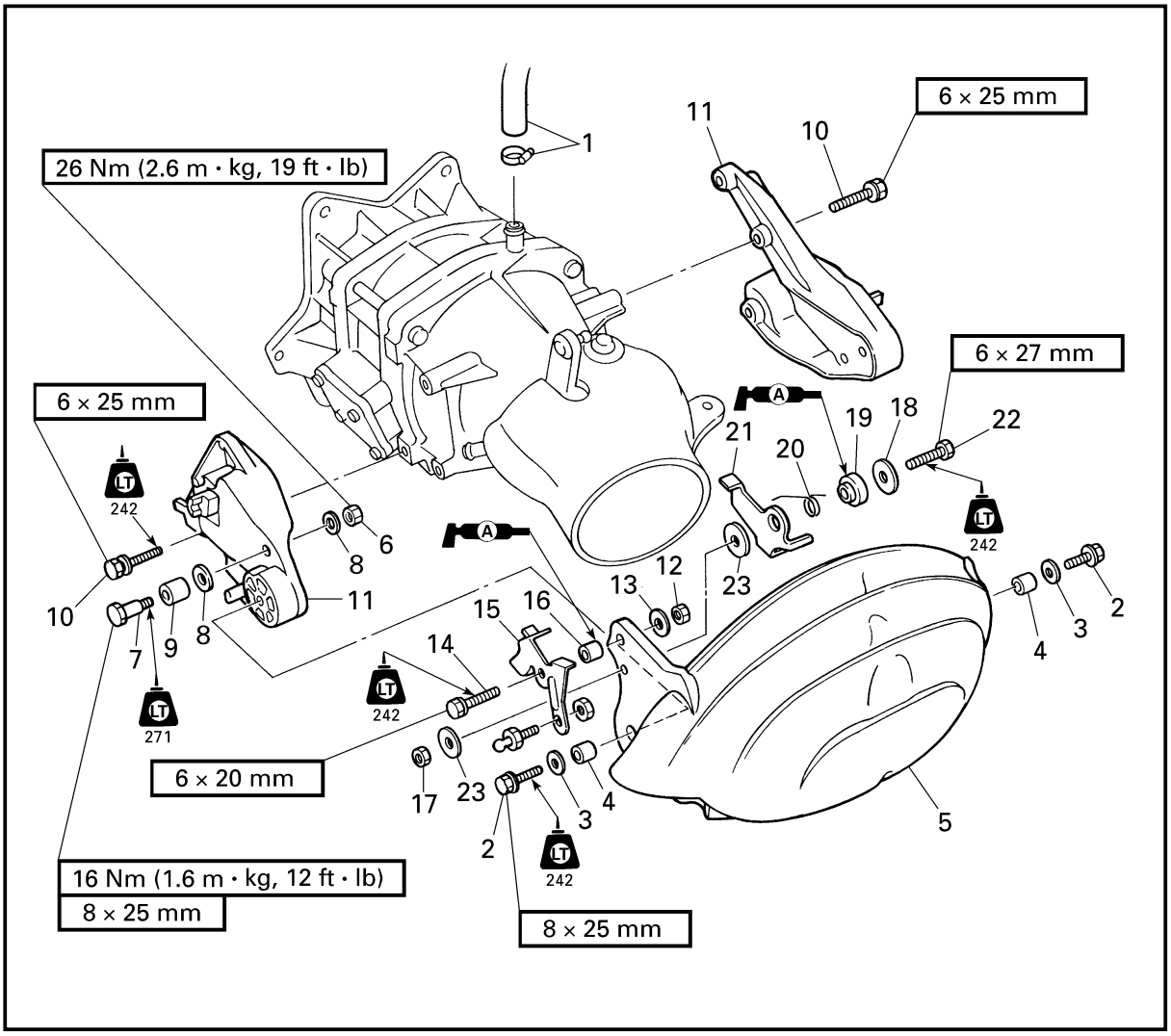
Step	Procedure/Part name	Q'ty	Service points
	REVERSE GATE REMOVAL		Follow the left "Step" for removal.
1	Clamp/spout hose	1/1	
2	Bolt	2	
3	Washer	2	
4	Collar	2	
5	Reverse gate assembly	1	
6	Nut	1	
7	Bolt	1	
8	Washer	2	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
9	Roller	1	
10	Bolt	6	
11	Reverse gate stay	2	
12	Nut	1	
13	Washer	1	
14	Bolt	1	
15	Lever	1	
16	Spacer	1	
17	Nut	1	

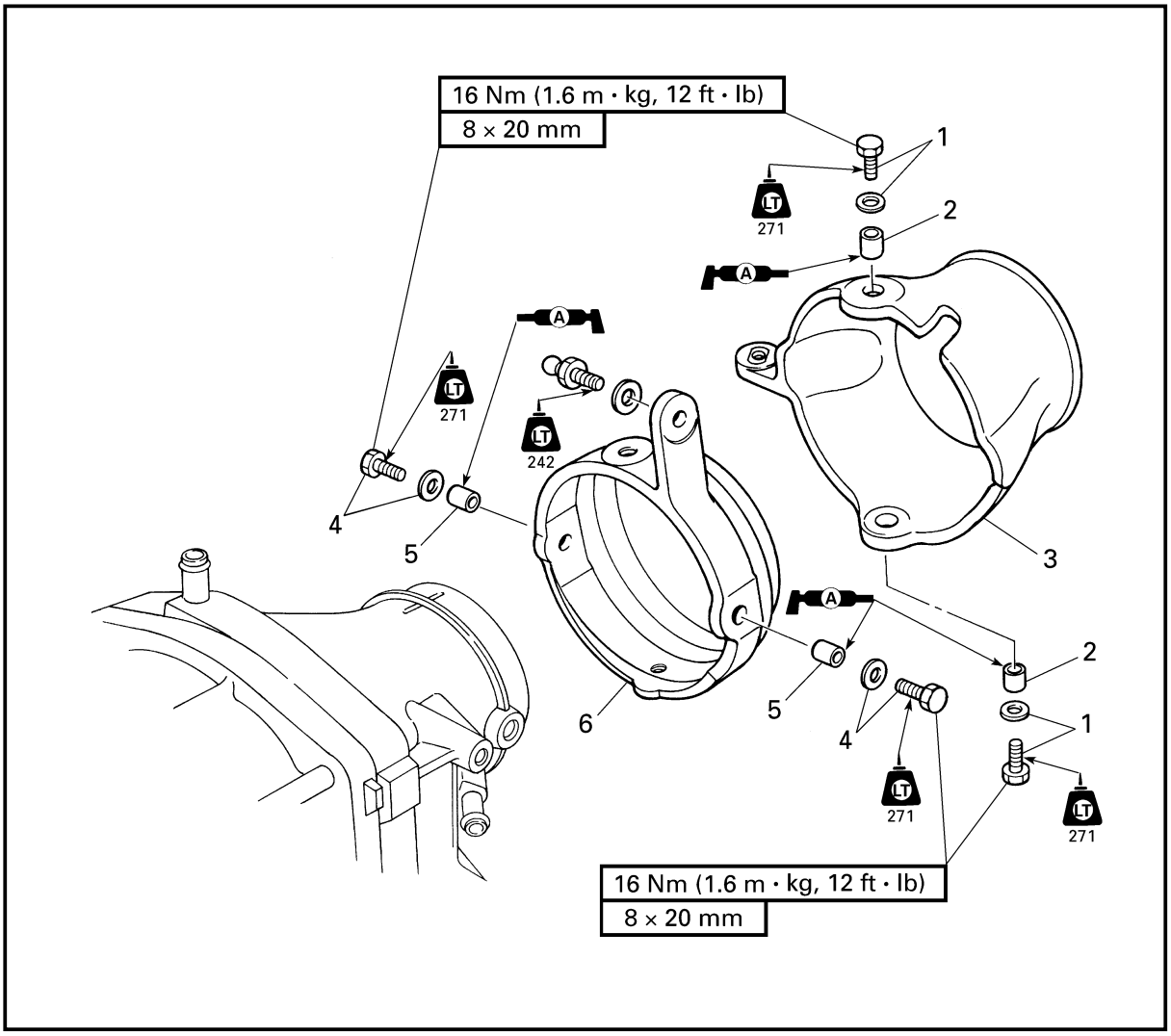
EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
18	Washer	1	
19	Collar	1	
20	Spring	1	
21	Lever	1	
22	Bolt	1	
23	Washer	2	
			Reverse the removal steps for installation.

NOZZLE DEFLECTOR AND NOZZLE RING

EXPLODED DIAGRAM

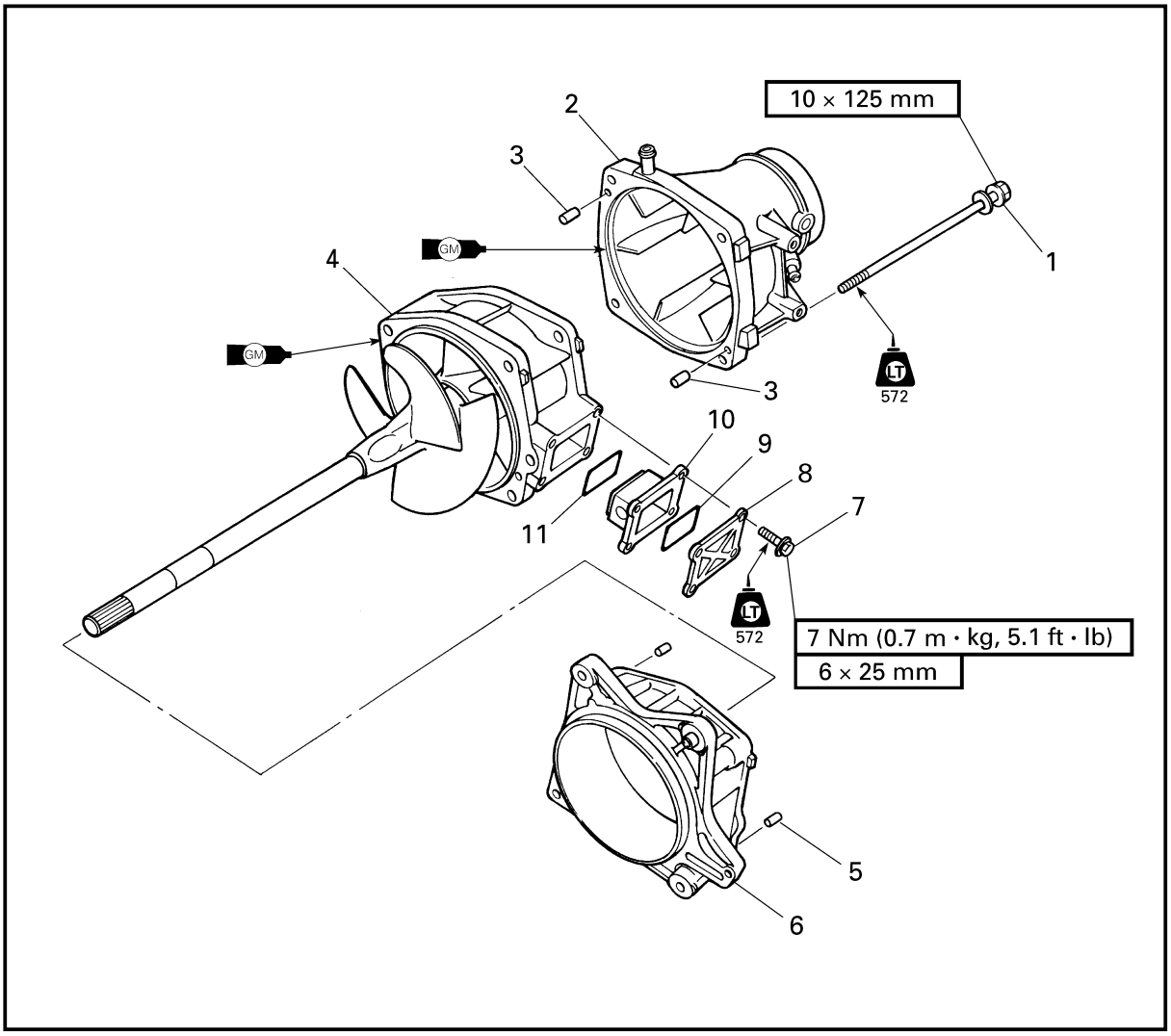


REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	NOZZLE DEFLECTOR AND NOZZLE RING REMOVAL		Follow the left "Step" for removal.
	Jet pump unit		Refer to "JET PUMP UNIT".
	Reverse gate		Refer to "REVERSE GATE".
1	Bolt/washer	2/2	
2	Spacer	2	
3	Nozzle deflector	1	
4	Bolt/washer	2/2	
5	Spacer	2	
6	Nozzle ring	1	
			Reverse the removal steps for installation.

IMPELLER DUCT, IMPELLER HOUSING, AND INTAKE DUCT

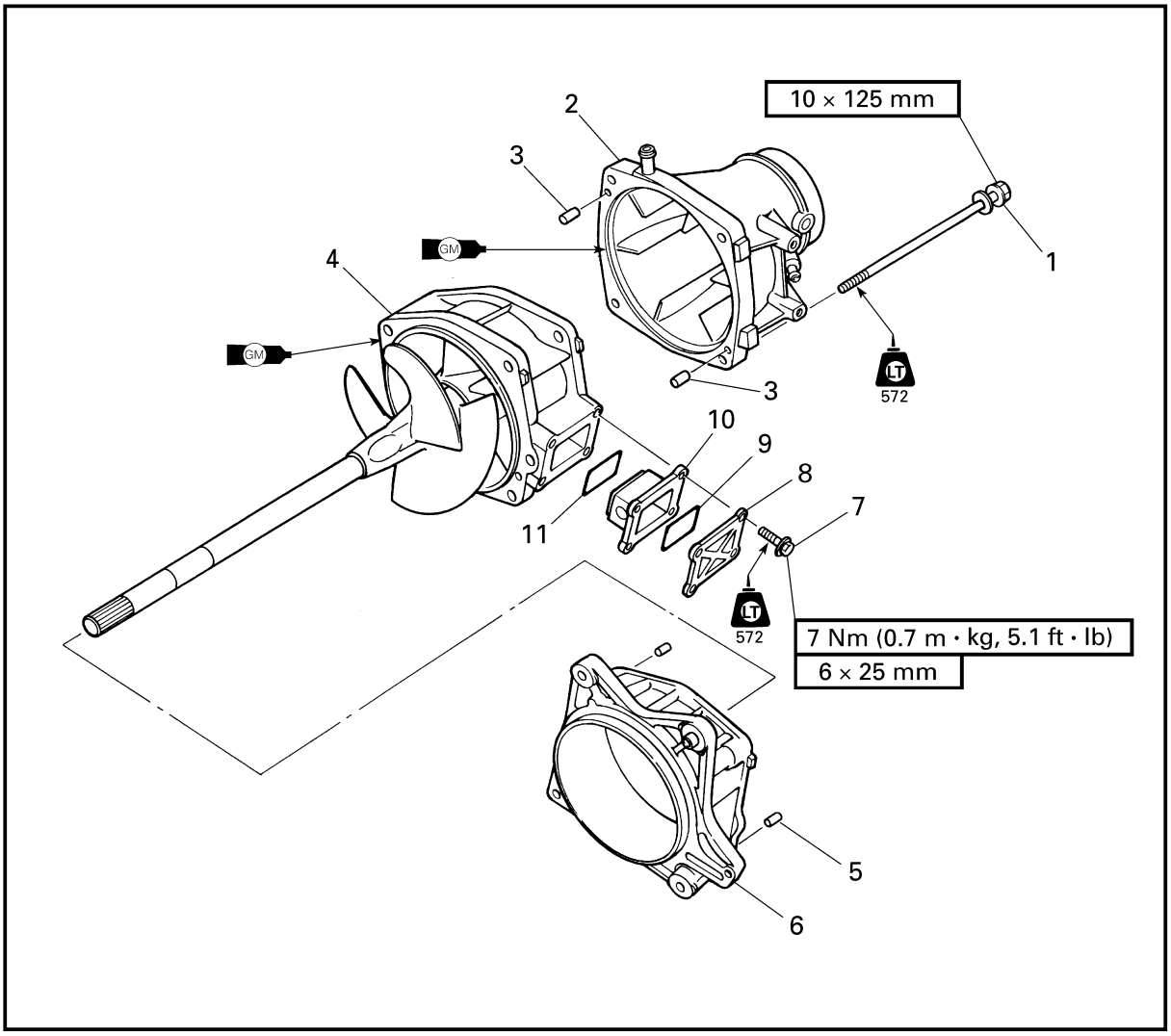
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	IMPELLER DUCT AND IMPELLER HOUSING REMOVAL		Follow the left "Step" for removal.
	Nozzle ring		Refer to "NOZZLE DEFLECTOR AND NOZZLE RING".
1	Bolt	4	
2	Nozzle	1	**NOTE:** Clean the contacting surfaces before applying the Gasket Maker®.
3	Pin	2	
4	Impeller duct assembly	1	
5	Pin	2	
6	Impeller housing	1	

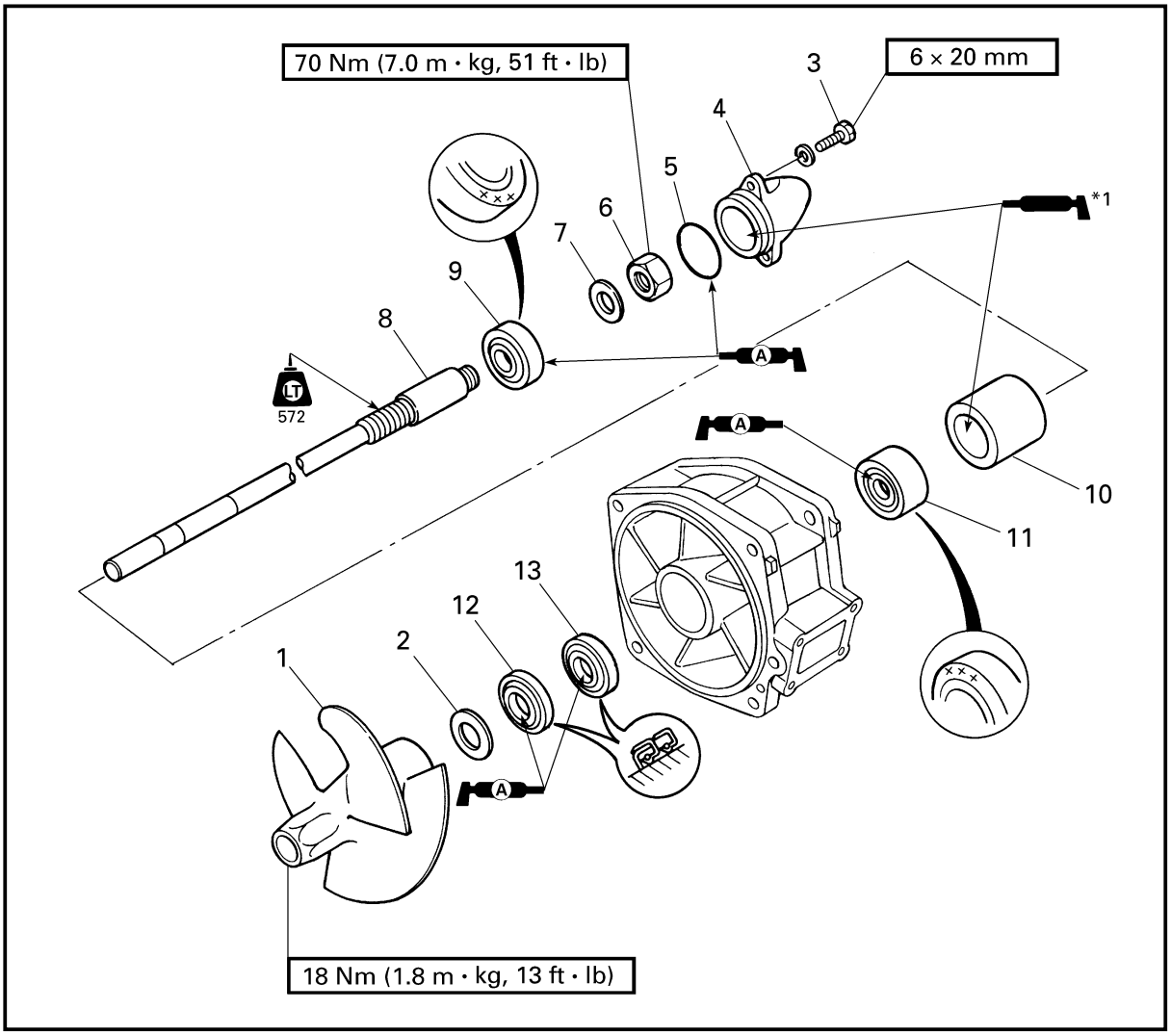
EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Bolt	4	
8	Cover	1	
9	Packing	1	
10	Filter	1	
11	Packing	1	
			Reverse the removal steps for installation.

IMPELLER DUCT AND DRIVE SHAFT

EXPLODED DIAGRAM

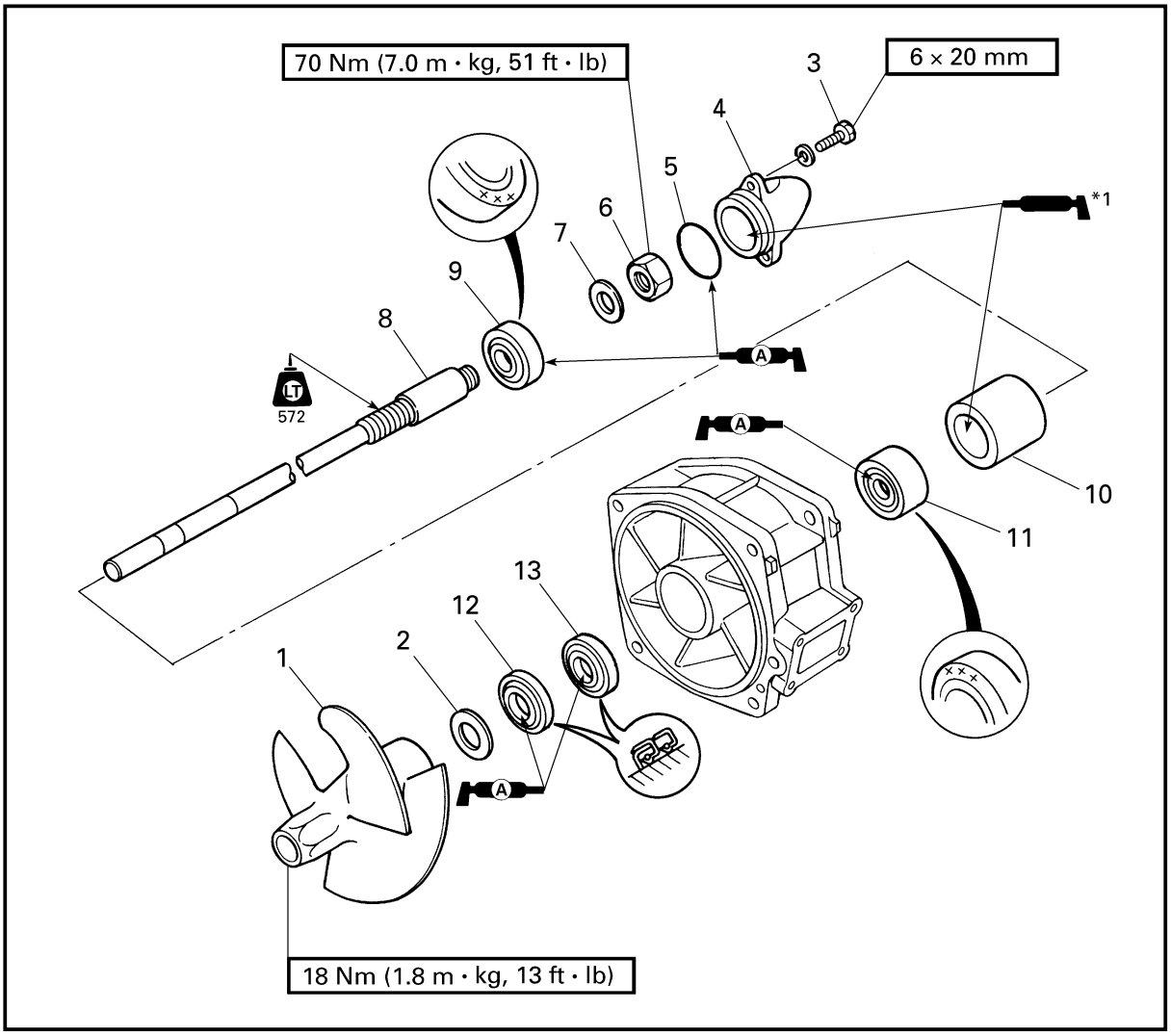


REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	IMPELLER DUCT AND DRIVE SHAFT DISASSEMBLY		Follow the left "Step" for disassembly.
1	Impeller	1	Left-hand threads
2	Spacer	1	
3	Bolt/washer	3/3	
4	Cap	1	
5	O-ring	1	
6	Nut	1	
7	Washer	1	

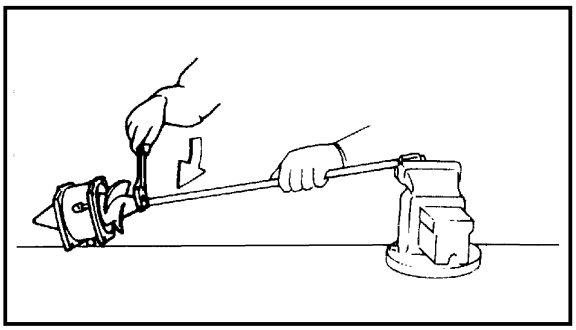
*1: EPNOC grease AP #0

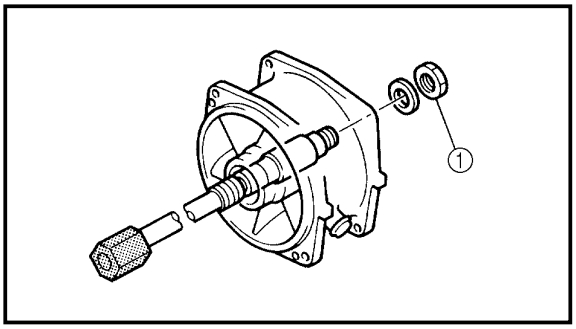
EXPLODED DIAGRAM

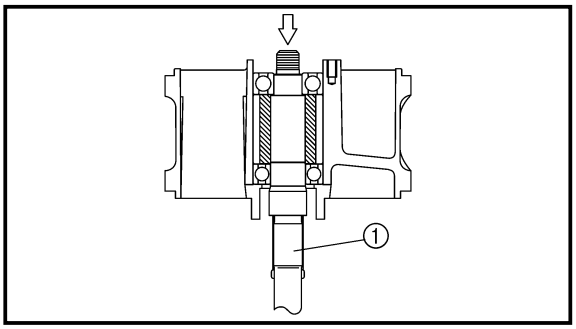


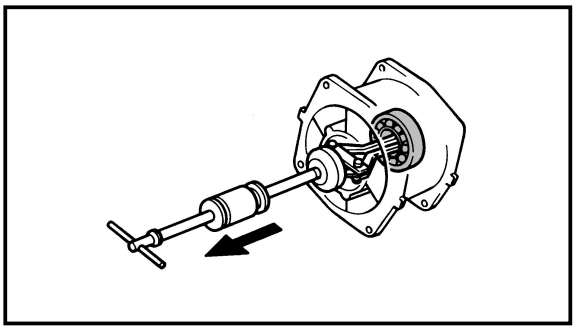
Step	Procedure/Part name	Q'ty	Service points
8	Drive shaft	1	
9	Rear bearing	1	**Not reusable**
10	Spacer	1	
11	Front bearing	1	**Not reusable**
12	Oil seal	1	
13	Oil seal	1	
			Reverse the disassembly steps for assembly.

*1: EPNOC grease AP #0









SERVICE POINTS

Drive shaft removal

1. Remove:
   - Impeller

	Drive shaft holder: **YB-06151/90890-06519**

NOTE:

The impeller has left-hand threads. Turn the impeller clockwise to loosen it.

2. Remove:
   - Nut ①

	Drive shaft holder: **YB-06151/90890-06519**

3. Remove:
   - Drive shaft ①

NOTE:

Remove the drive shaft with a press.

4. Remove:
   - Rear bearing
   - Front bearing

	Slide hammer set: **90890-06523** **YB-06096/90890-06531**

Impeller inspection

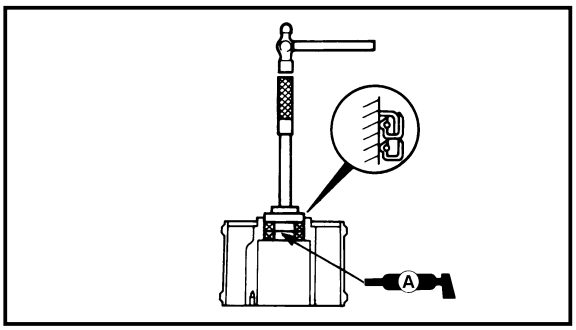
Refer to "JET PUMP UNIT" in chapter 3.

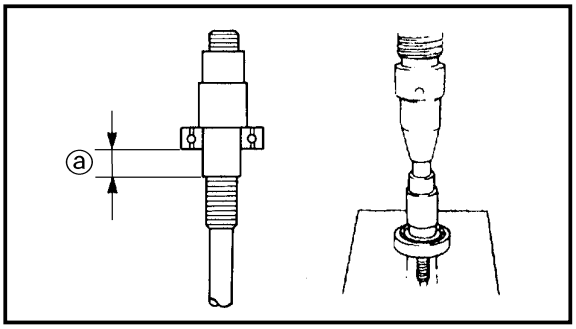
Drive shaft inspection

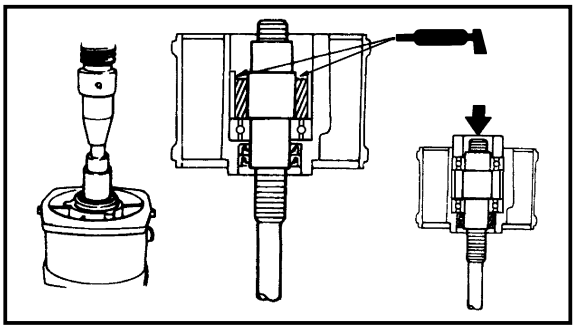
1. Inspect:
   - Drive shaft
     Damage/wear → Replace.

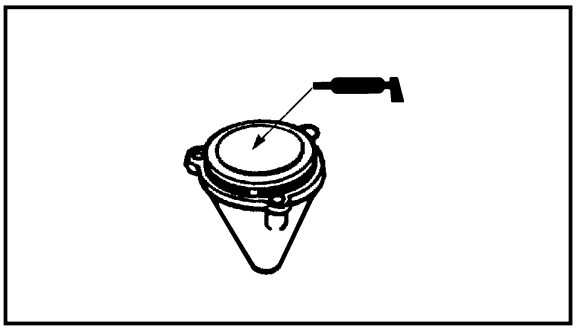
Bearing inspection

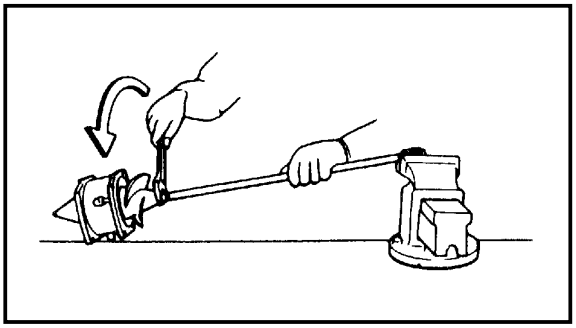
1. Inspect:
   - Front and rear bearings
     (rotate each inner race by hand)
     Damage/rough movement → Replace.











Drive shaft installation

1. Install:
   - Oil seal

	Driver rod: **YB-06071/90890-06606** **Ball bearing attachment:** **YB-06156/90890-06634**

2. Install:
   - Front bearing
   - Drive shaft

NOTE:

Install the front bearing and drive shaft with a press.

	Distance ⓐ: **23 ± 0.1 mm (0.91 ± 0.004 in)**

3. Add:
   - EPNOC grease AP #0
     (between the drive shaft and spacer)

	Quantity: **Approximately 1/3 of capacity**

4. Install:
   - Rear bearing

	Bearing inner race attachment: **YB-34474/90890-06662**

5. Add:
   - EPNOC grease AP #0 (into the cap)

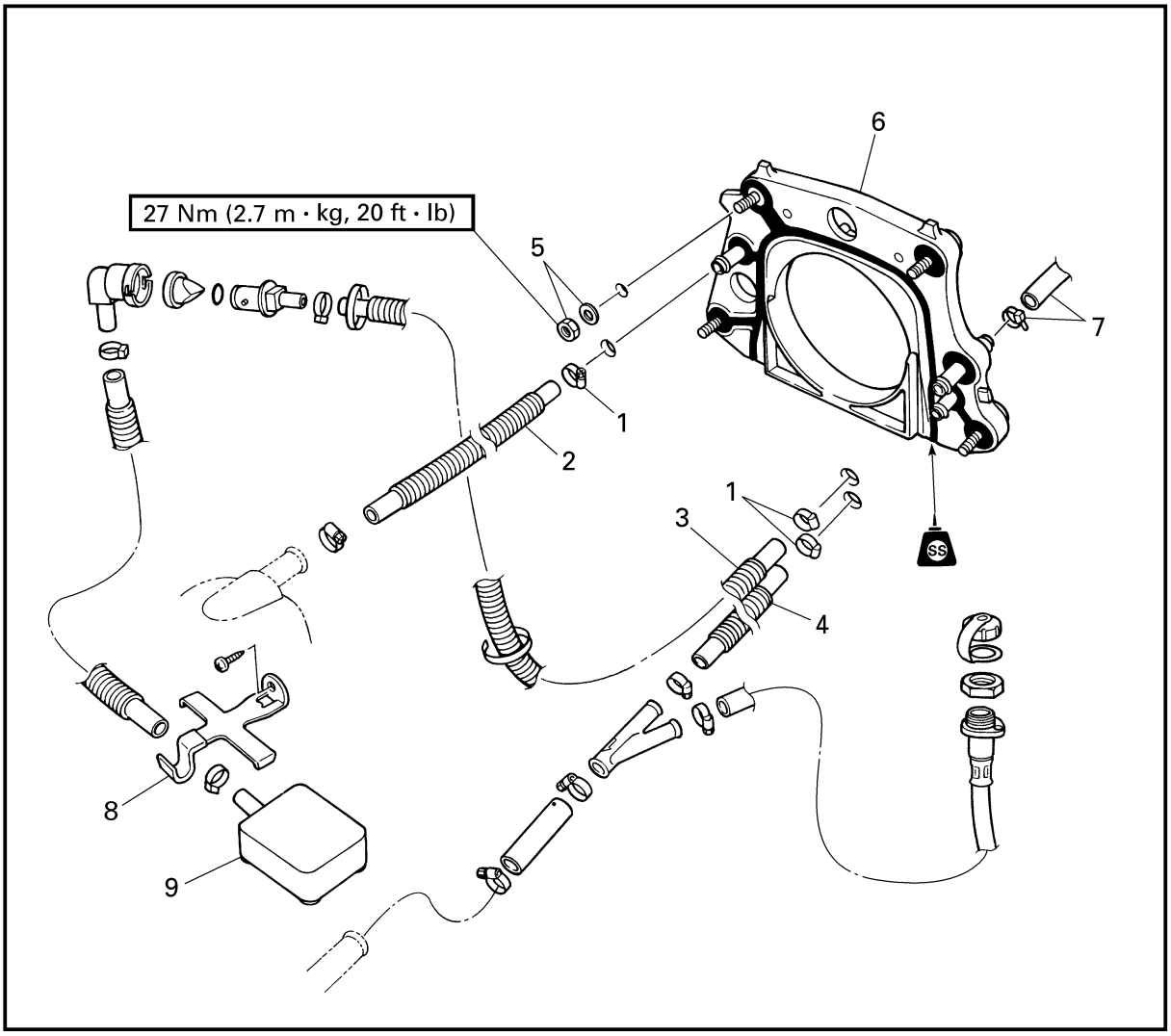
	Quantity: **Approximately 1/3 of capacity**

6. Install:
   - Nut
   - Impeller

	Drive shaft holder: **YB-06151/90890-06519**

TRANSOM PLATE AND HOSES

EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	TRANSOM PLATE AND HOSES REMOVAL		Follow the left "Step" for removal.
1	Hose clamp	3	
2	Hose	1	Cooling water outlet
3	Bilge hose 1	1	
4	Hose	1	Cooling water inlet
5	Nut/washer	4/4	
6	Transom plate	1	
7	Clamp/bilge hose 2	1/1	
8	Holder	1	
9	Bilge filter	1	
			Reverse the removal steps for installation.

SERVICE POINTS

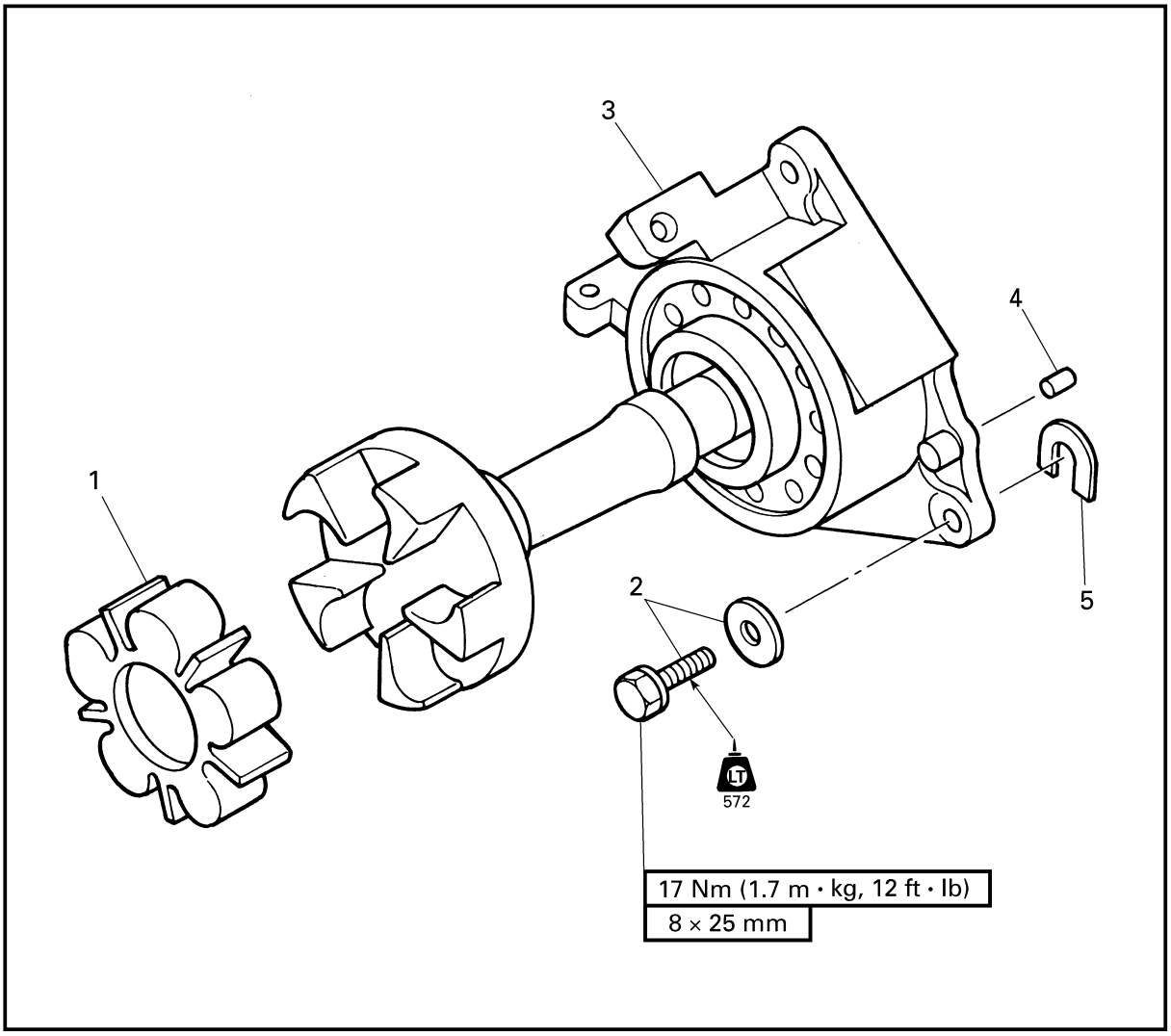
Bilge strainer inspection

Refer to "JET PUMP UNIT" in chapter 3.

Bilge hose inspection

1. Inspect:
   - Bilge hose
     Cracks/damage/wear → Replace.

BEARING HOUSING
EXPLODED DIAGRAM

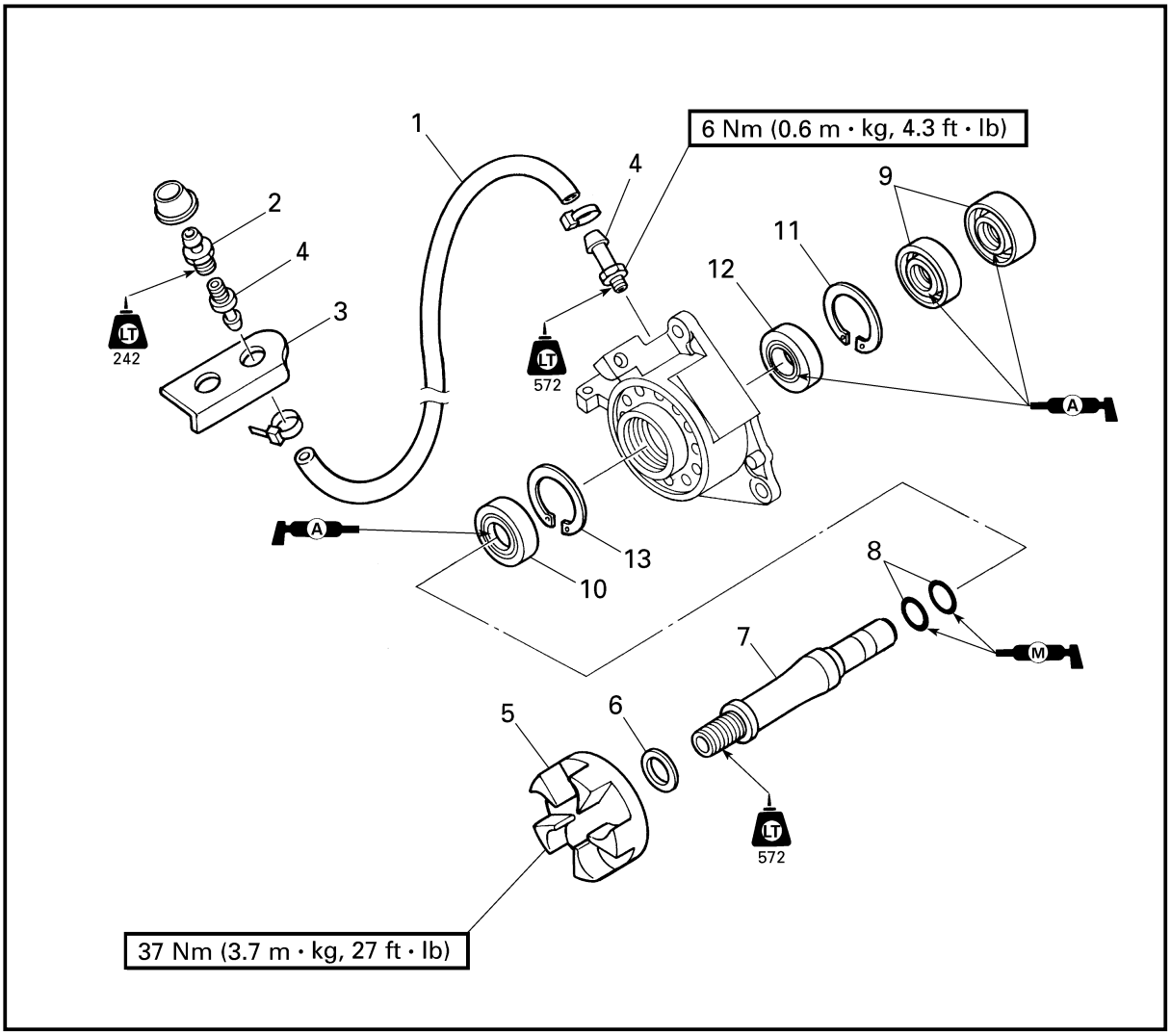


REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	BEARING HOUSING REMOVAL		Follow the left "Step" for removal.
	Engine unit		Refer to "ENGINE UNIT" in chapter 5.
1	Rubber coupling	1	
2	Bolt/washer	3/3	
3	Bearing housing assembly	1	
4	Pin	2	
5	Shim	*	**NOTE:** Install the shims in their original locations.
			Reverse the removal steps for installation.

*: As required

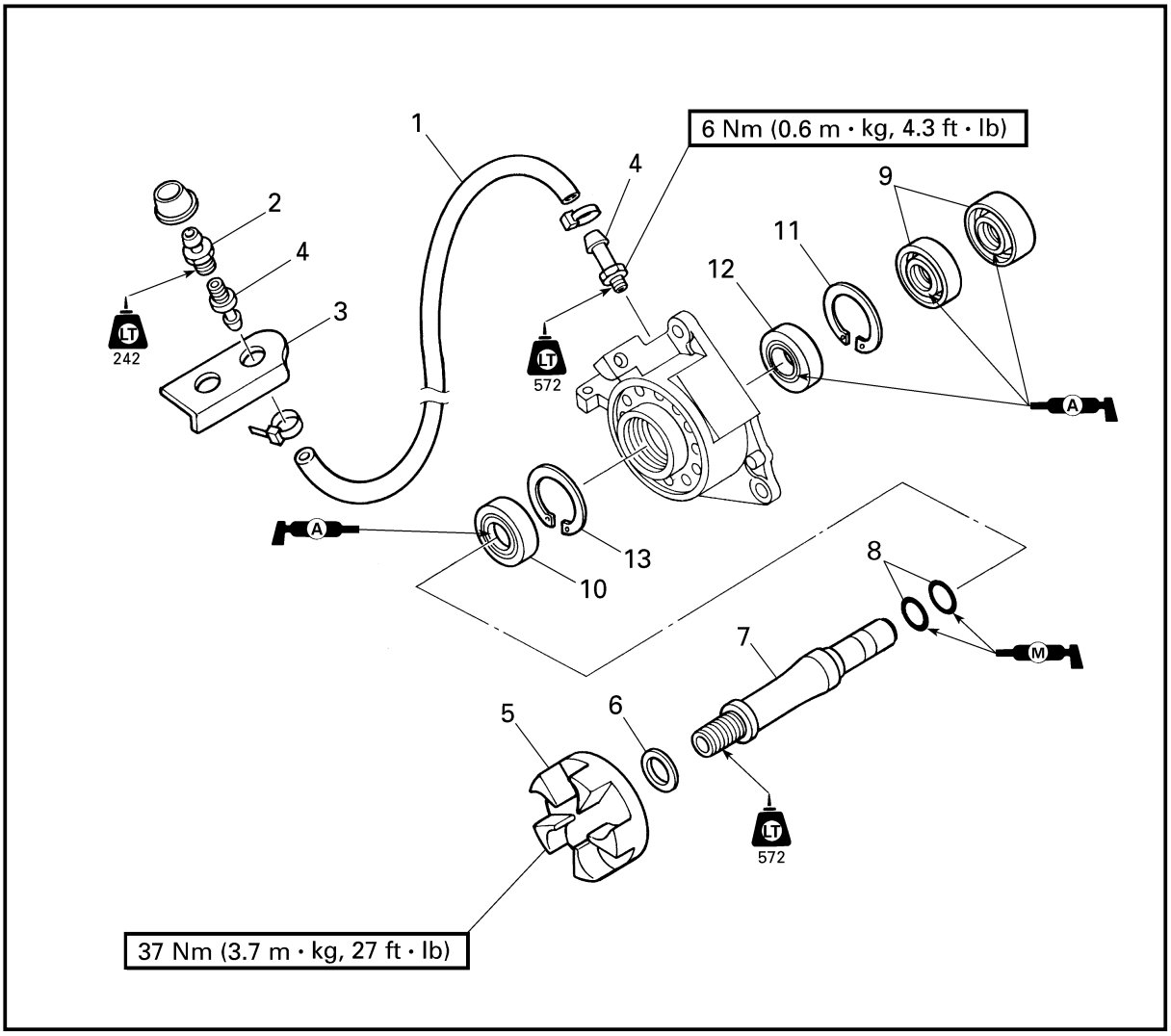
EXPLODED DIAGRAM



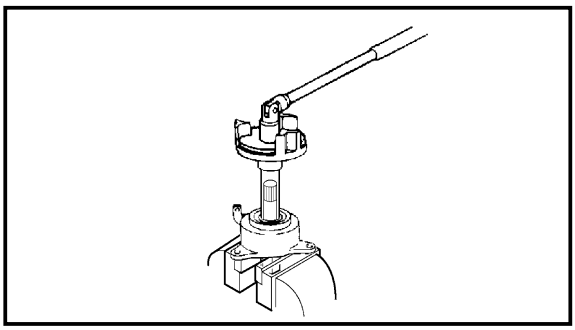
REMOVAL AND INSTALLATION CHART

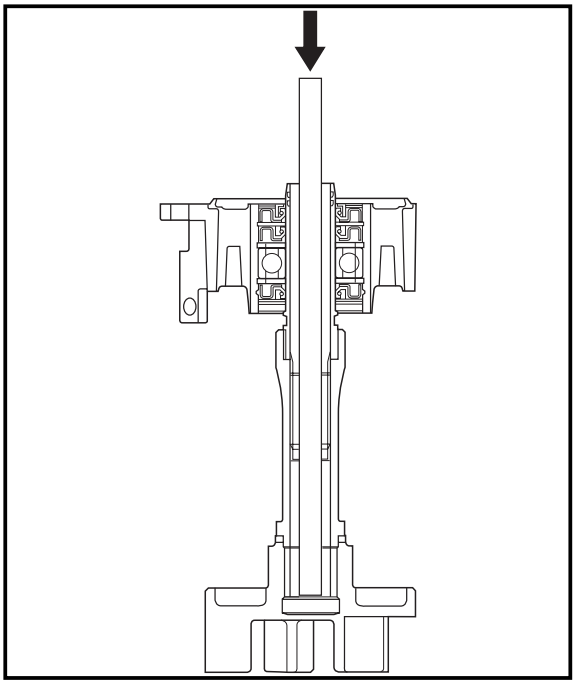
Step	Procedure/Part name	Q'ty	Service points
	BEARING HOUSING DISASSEMBLY		Follow the left "Step" for disassembly.
1	Grease hose	1	
2	Grease nipple	1	
3	Grease nipple stay	1	
4	Nipple	2	
5	Driven coupling	1	
6	Washer	1	
7	Driven coupling shaft	1	

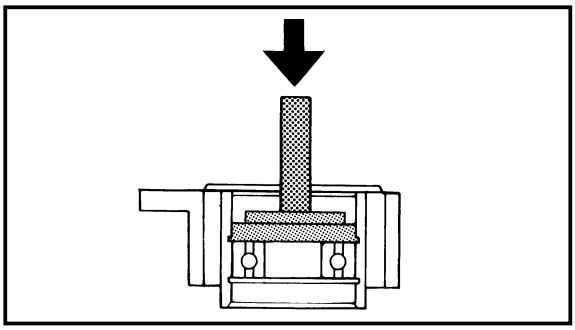
EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
8	O-ring	2	
9	Oil seal	2	
10	Oil seal	1	
11	Circlip	1	
12	Bearing	1	
13	Circlip	1	
			Reverse the disassembly steps for assembly.







SERVICE POINTS

Driven coupling removal and installation

1. Remove and install:
   - Driven coupling

Coupler wrench:
YW-06551/90890-06551
Shaft holder:
YB-06552/90890-06552

NOTE:

Install the driven coupling with the same special tools that were used for removal.

Driven coupling shaft removal

1. Remove:
   - Driven coupling shaft

Removal steps:
- Temporarily install the driven coupling to the driven coupling shaft.
- Insert the long rod to the driven coupling shaft.
- Press out the driven coupling shaft by pushing the rod.

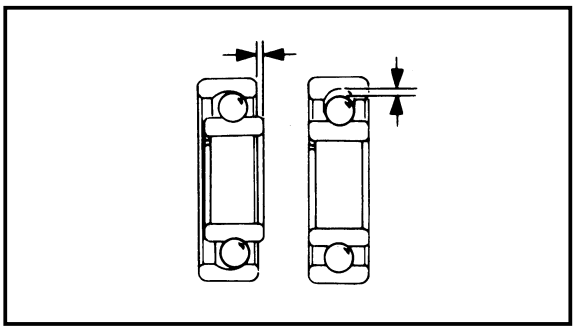
Bearing removal

1. Remove:
   - Bearing

Driver rod:
YB-06071/90890-06606
Bearing outer race attachment:
YB-06016/90890-06626

NOTE:

Install the bearing with the same special tools that were used for removal.

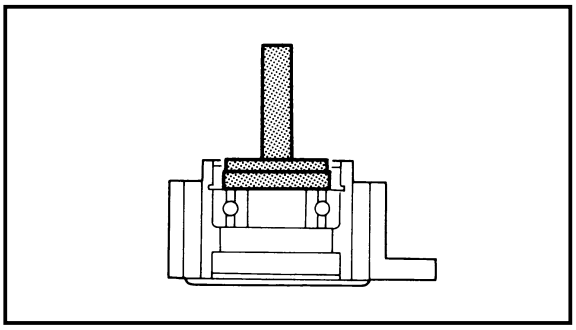


Bearing, driven coupling shaft, and grease hose inspection

1. Inspect:
   - Bearing
     Rotate the inner race by hand.
     Damage/rough movement → Replace.
   - Driven coupling shaft
     Damage/pitting → Replace.
   - Grease hose
     Cracks/wear → Replace.

Driven coupling inspection

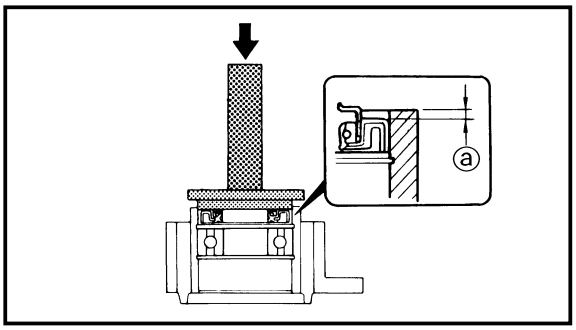
1. Inspect:
   - Driven coupling
   - Driven coupling damper
     Damage/wear → Replace.



Bearing installation

1. Install:
   - Bearing

Driver rod:
YB-06071/90890-06606
Bearing outer race attachment:
YB-06016/90890-06626



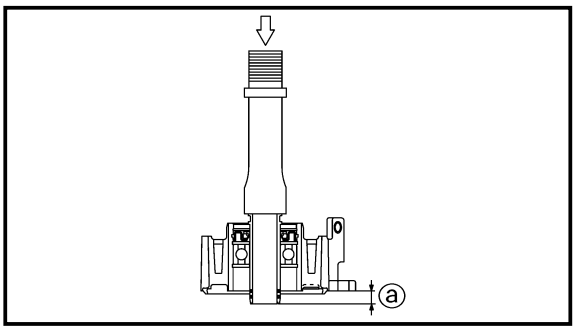
Oil seal installation

1. Install:
   - Oil seal

Driver rod:
YB-06071/90890-06606
Bearing outer race attachment:
YB-06016/90890-06626

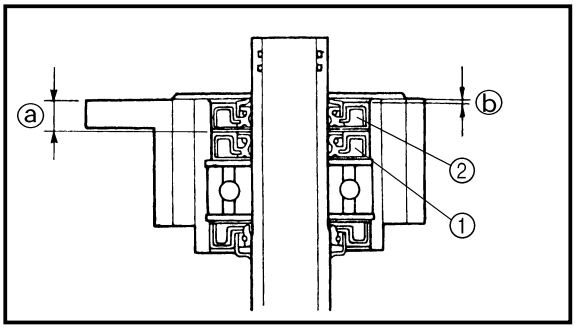
NOTE:
Before installing the oil seal, lubricate the clip groove with water resistant grease.

Distance ⓐ:
6.8 ~ 7.2 mm (0.27 ~ 0.28 in)



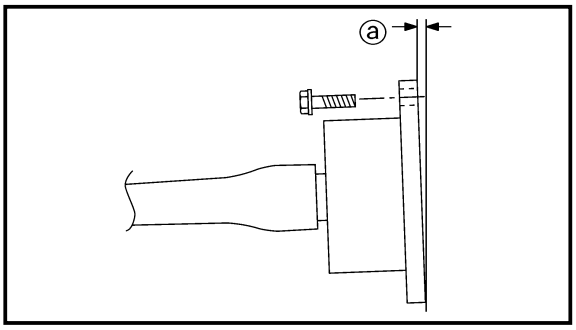
2. Install:
   - Driven coupling shaft

Distance ⓐ:
9.5 ~ 10.5 mm (0.37 ~ 0.41 in)



3. Install:
   - Oil seal ① [8 mm (0.31 in)]
   - Oil seal ② [10 mm (0.39 in)]

Distance ⓐ:
10.3 ~ 10.7 mm (0.41 ~ 0.42 in)
Distance ⓑ:
1.6 ~ 2.0 mm (0.06 ~ 0.07 in)



Bearing housing installation

1. Install:
   - Bearing housing
   - Shim

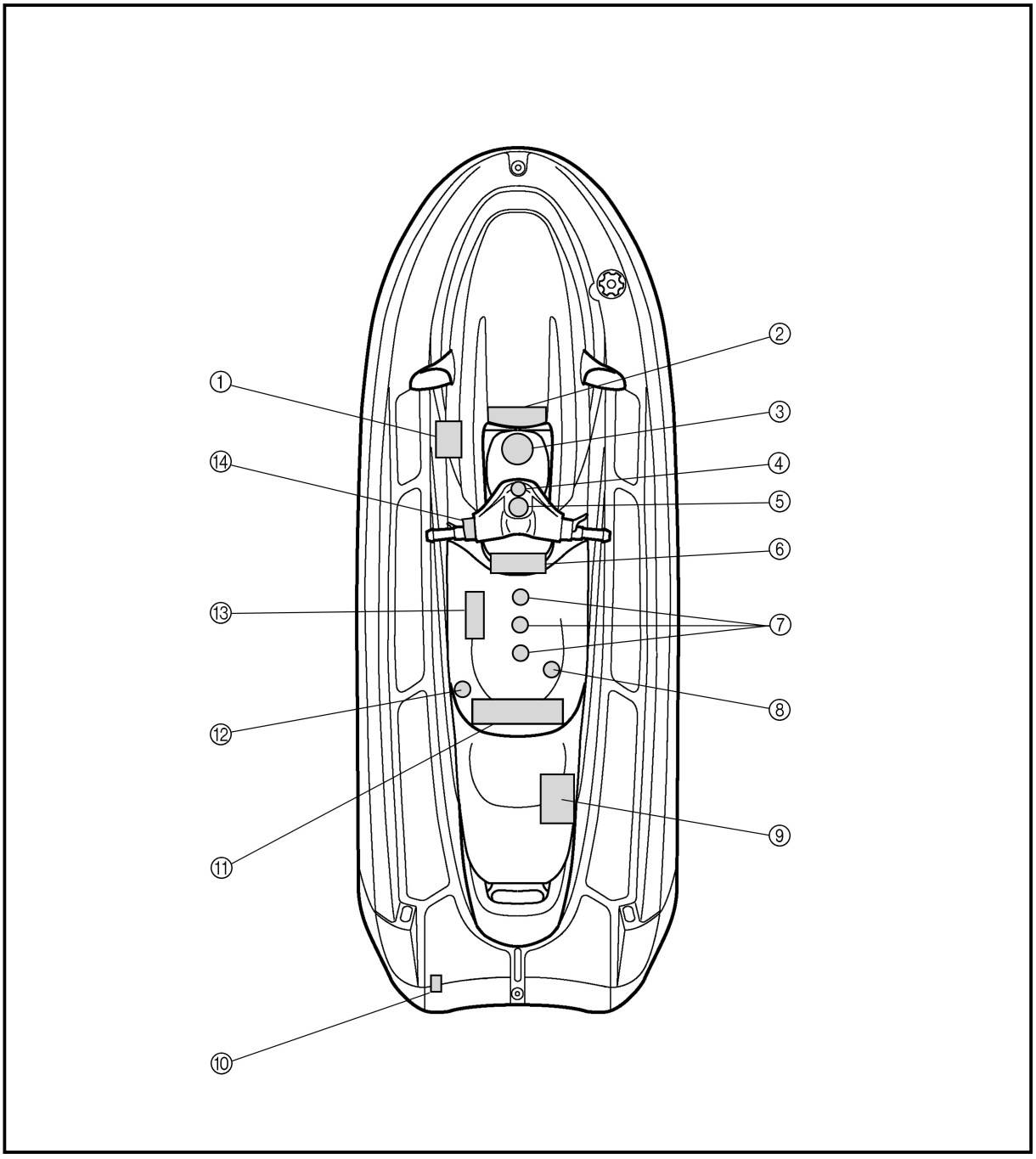
Installation steps:
- Install the bearing housing.
- Measure the clearance ⓐ at each bolt hole.
- Install the suitable shim from the table below.

Clearance ⓐ	Shim thickness
0 ~ 0.2 mm (0 ~ 0.010 in)	No need
0.3 ~ 0.7 mm (0.011 ~ 0.030 in)	0.5 mm
0.8 ~ 1.2 mm (0.031 ~ 0.050 in)	1.0 mm
1.3 ~ 2.0 mm (0.051 ~ 0.078 in)	1.5 mm

NOTE:
Install the shim(s) to the original position if the bearing housing is not replaced.

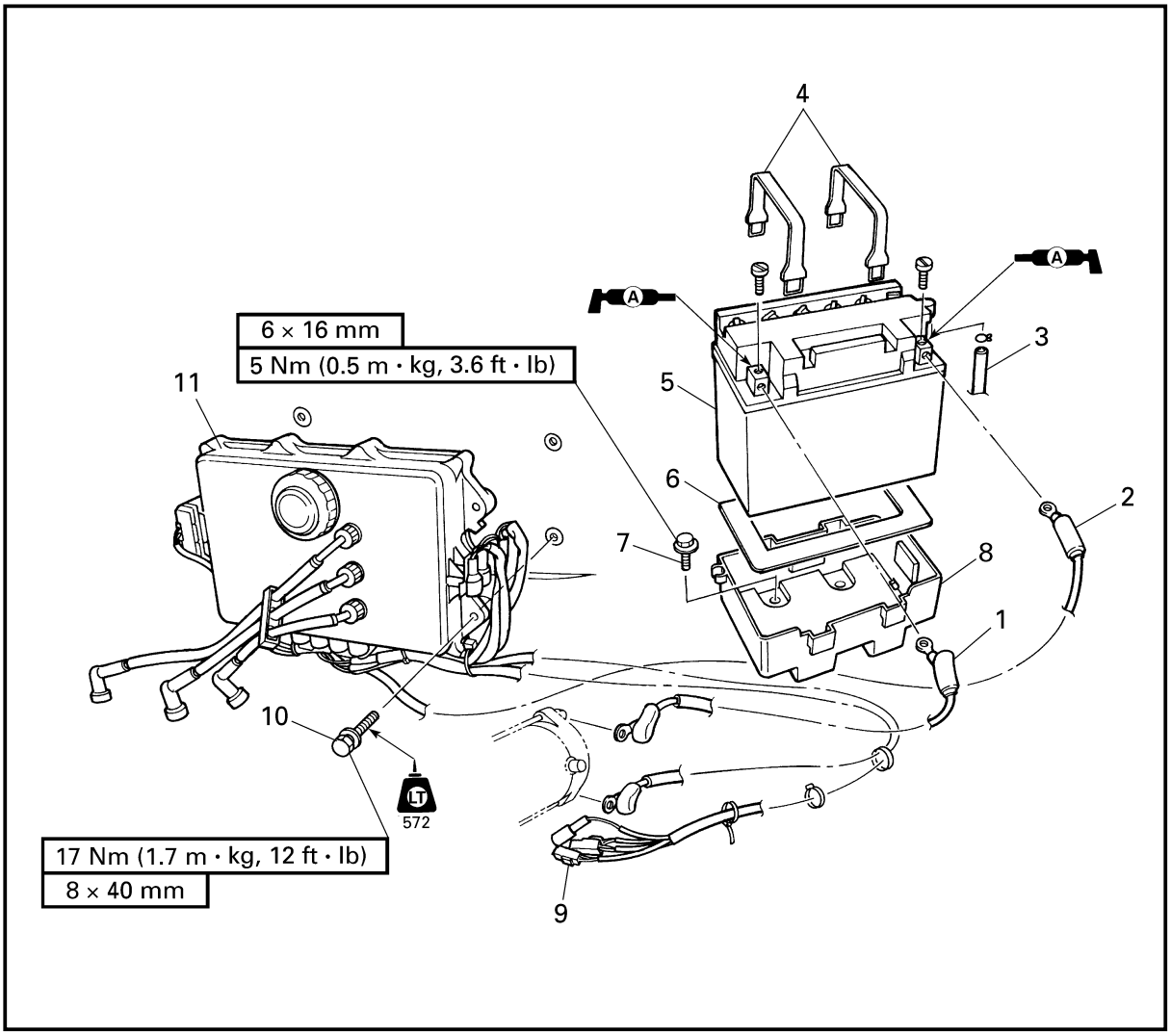
CHAPTER 7
ELECTRICAL SYSTEM

ELECTRICAL COMPONENTS



① YPVS servomotor
② Multi-function meter
③ Fuel level sensor
④ Buzzer
⑤ Oil level sensor
⑥ Stator coil and pickup coil
⑦ Spark plugs
⑧ Exhaust temperature sensor
⑨ Battery
⑩ Speed sensor
⑪ Electrical box
⑫ Water temperature sensor
⑬ Starter motor
⑭ Engine stop switch, engine stop lanyard switch and starter switch

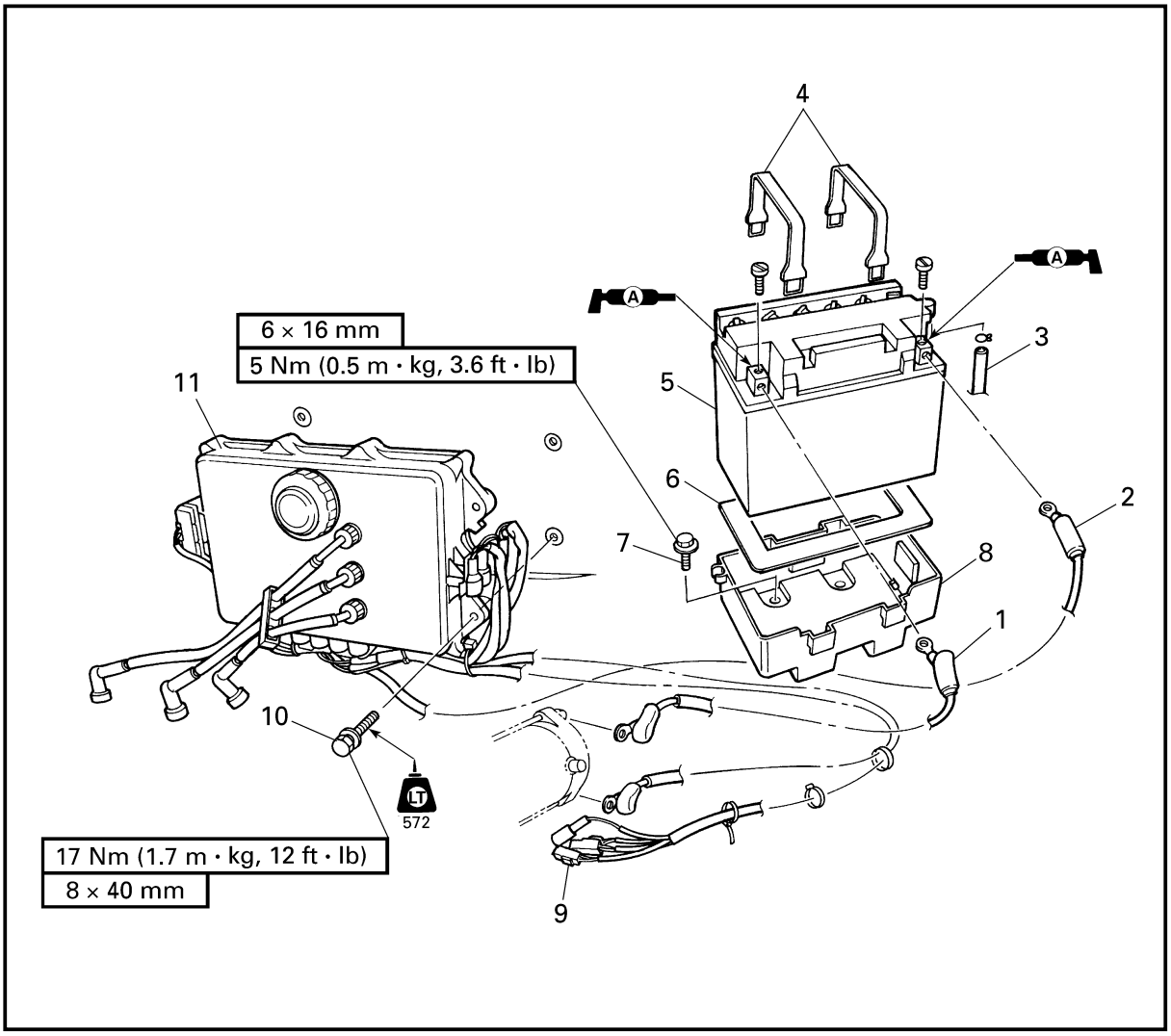
ELECTRICAL BOX
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

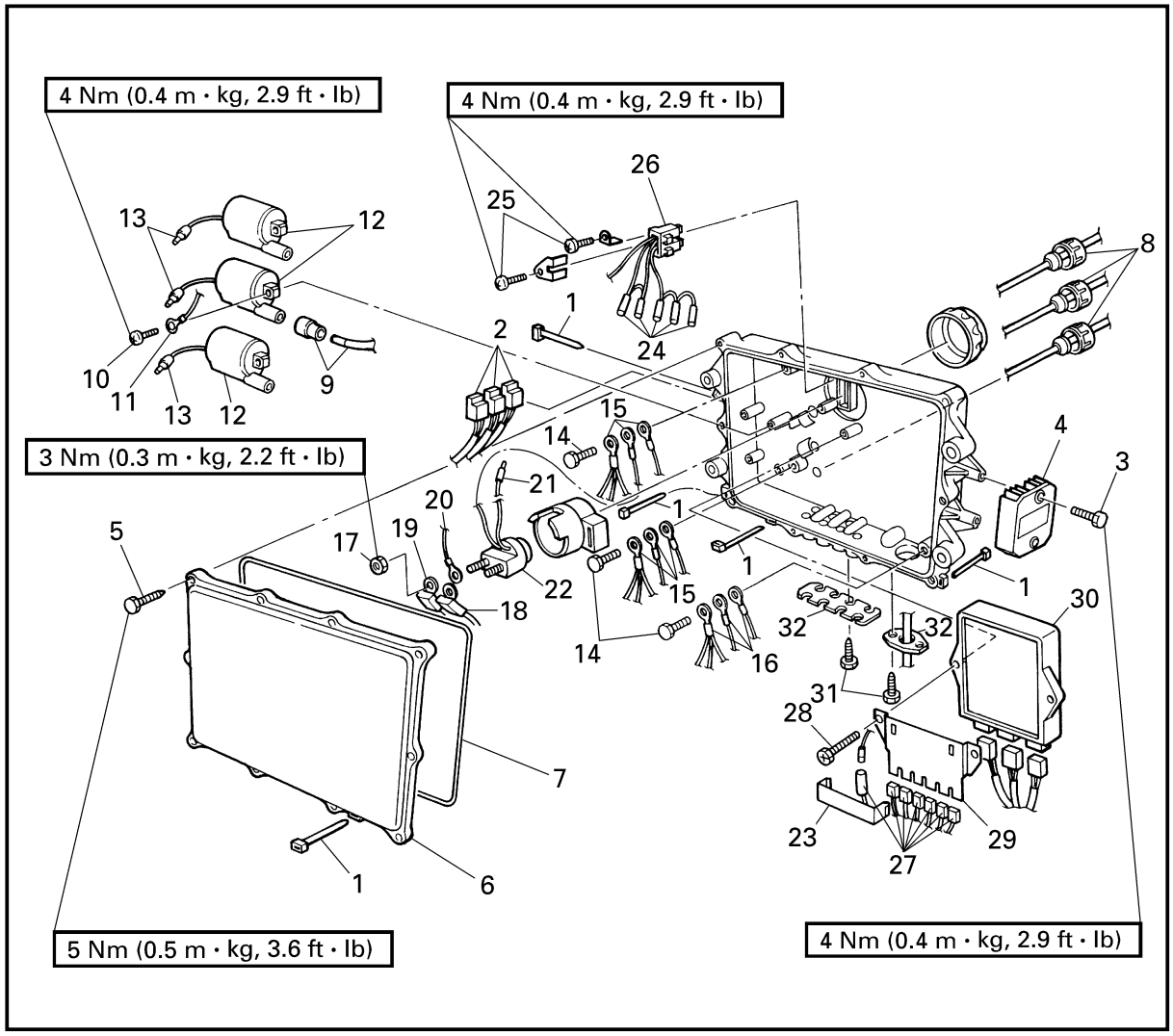
Step	Procedure/Part name	Q'ty	Service points
	ELECTRICAL BOX REMOVAL		Follow the left "Step" for removal.
	Exhaust chamber assembly		Refer to "EXHAUST CHAMBER ASSEMBLY" in chapter 5.
	Exhaust manifold		Refer to "EXHAUST MANIFOLD" in chapter 5.
	Spark plug lead		
1	Battery negative lead	1	
2	Battery positive lead	1	
3	Breather hose	1	
4	Band	2	
5	Battery	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
6	Damper	1	
7	Bolt	4	
8	Battery box	1	
9	Coupler	4	For multi-function meter
10	Bolt	4	
11	Electrical box	1	
			Reverse the removal steps for installation.

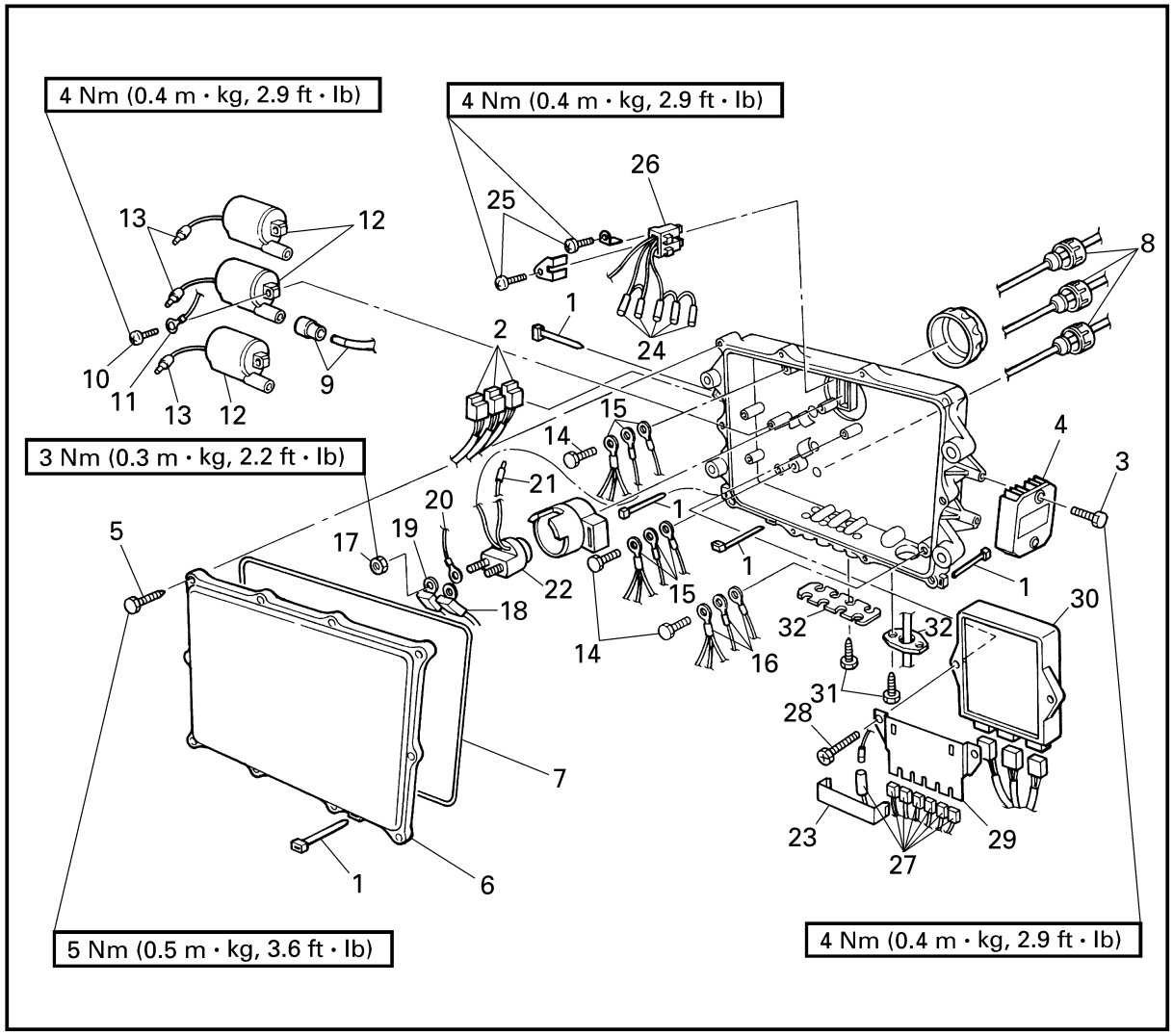
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

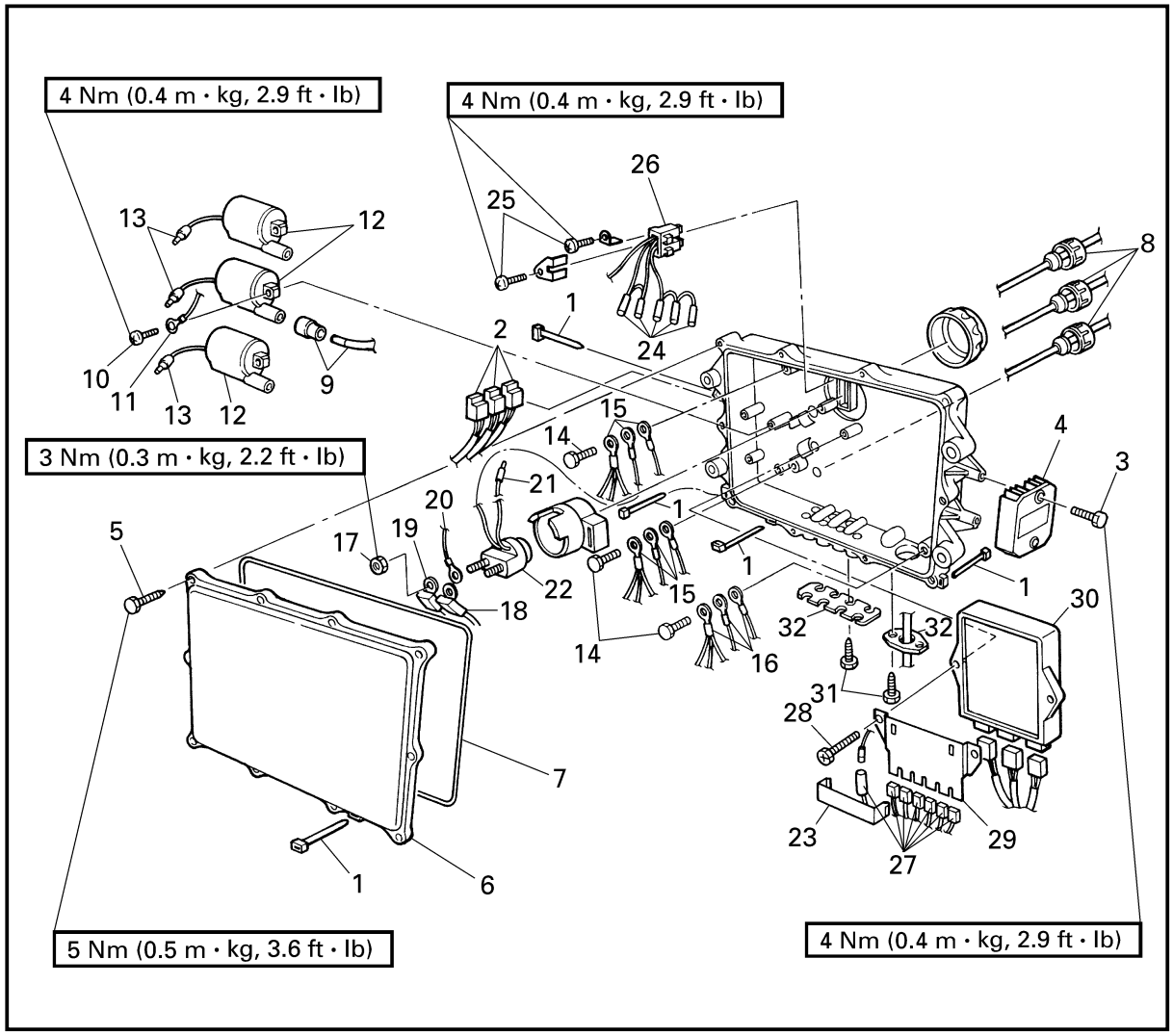
Step	Procedure/Part name	Q'ty	Service points
	ELECTRICAL BOX DISASSEMBLY		Follow the left "Step" for disassembly.
1	Clamp	5	
2	Coupler	3	For overheat, exhaust temperature sensor and lighting coil
3	Screw	2	
4	Rectifier/regulator	1	
5	Screw	10	
6	Cover	1	
7	Packing	1	
8	Spark plug lead holder	3	
9	Spark plug lead/cap	3/3	
10	Screw	6	

EXPLODED DIAGRAM

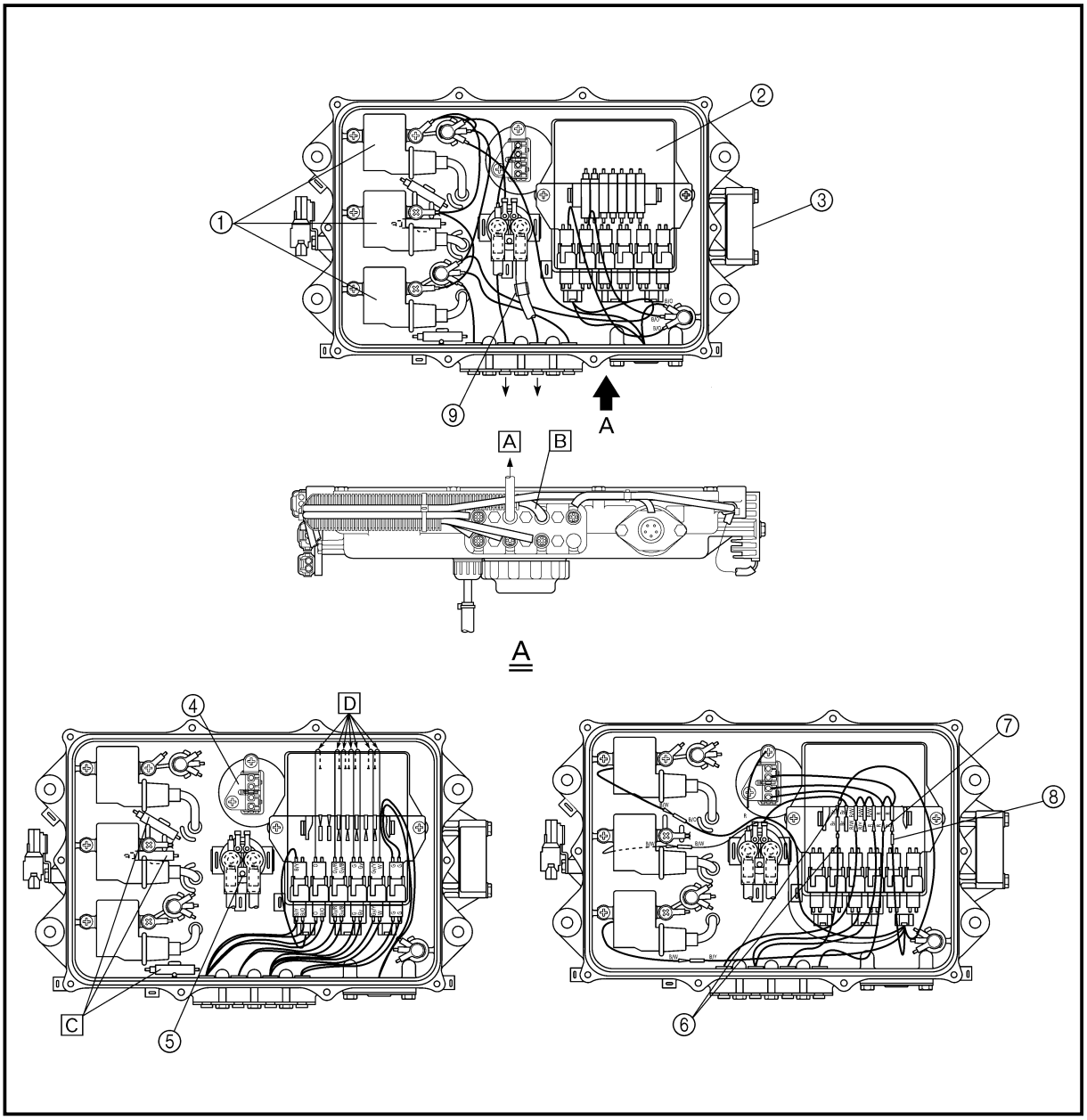


Step	Procedure/Part name	Q'ty	Service points
11	Ground lead	3	
12	Ignition coil	3	
13	Ignition coil lead	3	
14	Bolt	3	
15	Ground lead	6	
16	Lead	3	Black/Orange
17	Nut	2	
18	Starter motor lead	1	
19	Battery positive lead	1	
20	Fuse lead	1	
21	Starter relay lead	1	
22	Starter relay	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
23	Lead holder	1	
24	Fuse lead	5	
25	Screw	2	
26	Fuse holder	1	
27	Lead/coupler	1/6	
28	Screw	2	
29	Coupler bracket	1	
30	CDI unit	1	
31	Screw	8	
32	Lead holder plate	2	
			Reverse the disassembly steps for assembly.



① Ignition coil
② CDI unit
③ Rectifier/regulator
④ Fuse holder
⑤ Starter relay
⑥ Tape
⑦ Clear tube
⑧ Red tube
⑨ White tape

[A] To battery positive terminal
[B] To starter motor
[C] Affix the ignition coil connector to the electrical box holder.
[D] Pass the 8 pin coupler leads behind the CDI unit and insert them into the bracket.

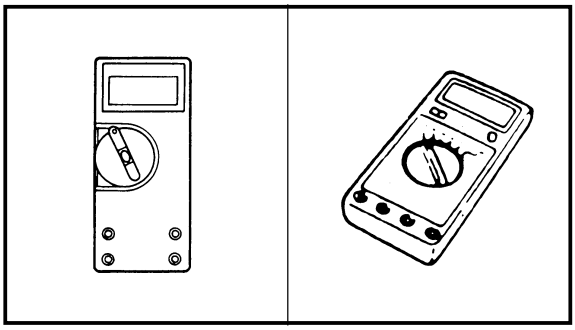
Br : Brown
G : Green
Gy : Gray

O : Orange
R : Red
W : White
B/O : Black/Orange
B/W : Black/White
B/Y : Black/Yellow
Gy/B : Gray/Black
Gy/R : Gray/Red
Gy/Y : Gray/Yellow
R/W : Red/White
R/Y : Red/Yellow

ELECTRICAL ANALYSIS
INSPECTION

CAUTION:

- **All measuring instruments should be handled with special care. Damaged or mishandled instruments will not measure properly.**
- **On an instrument powered by dry batteries, check the battery's voltage periodically and replace the batteries if necessary.**



Digital circuit tester

NOTE:

Throughout this chapter the digital circuit tester's part number has been omitted. Refer to the following part number.

Digital circuit tester:
J-39299/90890-06752

NOTE:

" ○——○ " indicates a continuity of electricity; i.e., a closed circuit at the respective switch position.

Low resistance measurement

NOTE:

- When measuring a resistance of 10 Ω or less with the digital tester, the correct measurement cannot be obtained because of the tester's internal resistance.
- To obtain the correct value, subtract the internal resistance from the displayed measurement.
- The internal resistance of the tester can be obtained by connecting both of its terminals.

Correct value =
Displayed measurement –
Internal resistance

Peak voltage measurement

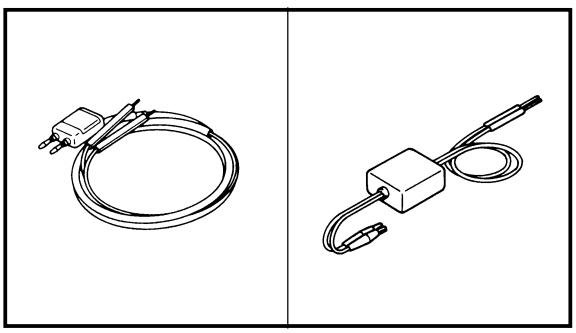
NOTE:

- When checking the condition of the ignition system it is vital to know the peak voltage.
- Cranking speed is dependant on many factors (e.g., fouled or weak spark plugs, a weak battery). If one of these is defected, the peak voltage will be lower than specification.
- If the peak voltage measurement is not within specification the engine will not operate properly.
- A low peak voltage will also cause components to prematurely wear.

Peak voltage adaptor

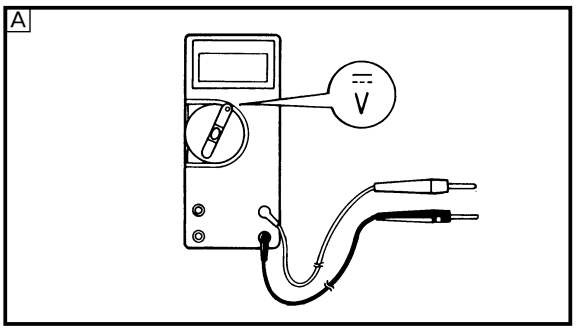
NOTE:

- Throughout this chapter the peak voltage adaptor's part number has been omitted. Refer to the following part number.
- The peak voltage adaptor should be used with the digital circuit tester.



Peak voltage adaptor:
YU-39991/90890-03169

A



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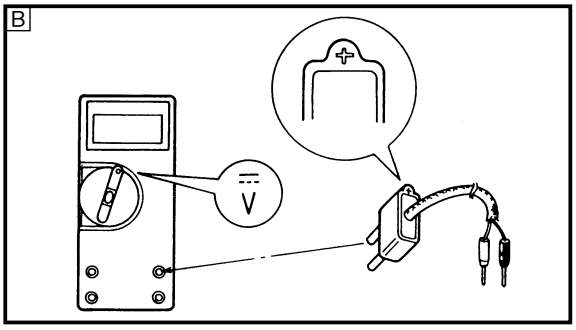
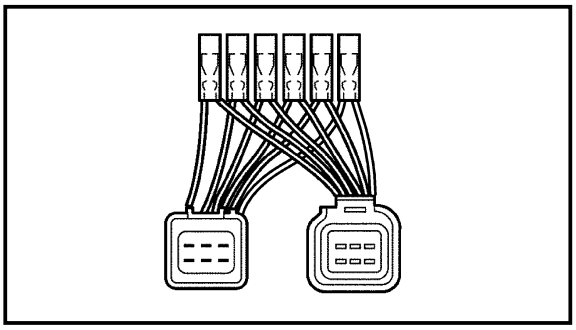
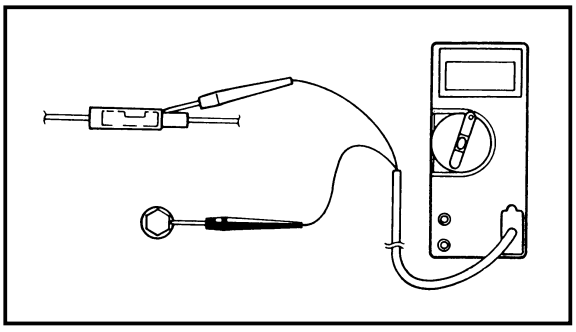
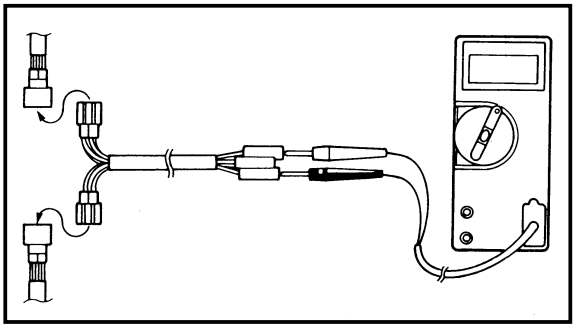








- When measuring the peak voltage, connect the peak voltage adaptor to the digital tester and switch the selector to the DC voltage mode.

NOTE:

- Make sure that the adaptor leads are properly installed in the digital circuit tester.
- Make sure that the positive pin (the "+" mark facing up as shown) on the adaptor is installed into the positive terminal of the tester.
- The test harness is needed for the following tests.

A Voltage measurement
B Peak voltage measurement

Test harness

YW-	90890-	Pin	Usage
06780	06780	6	Pick-up coil and lighting coil

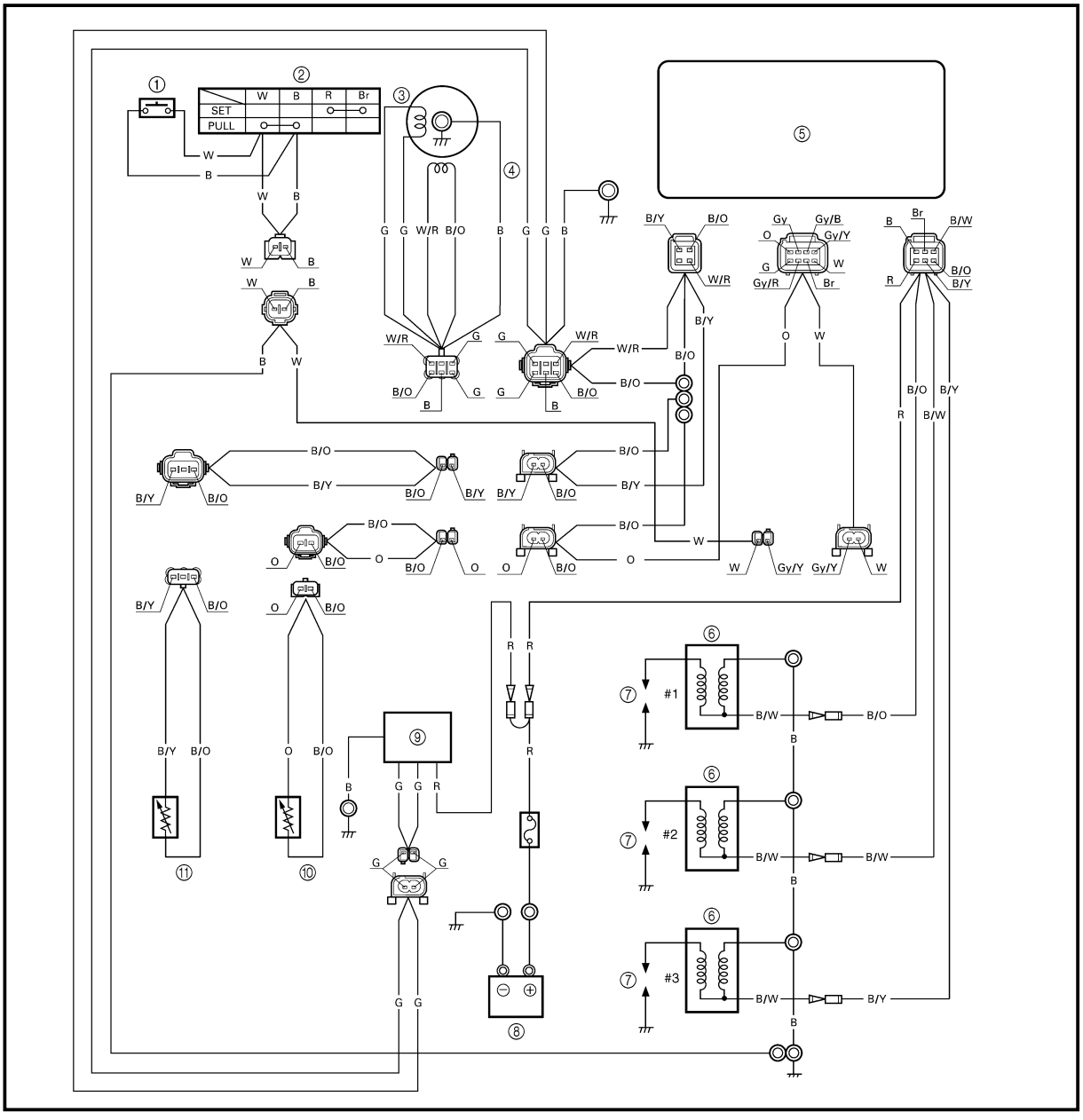
Checking steps:

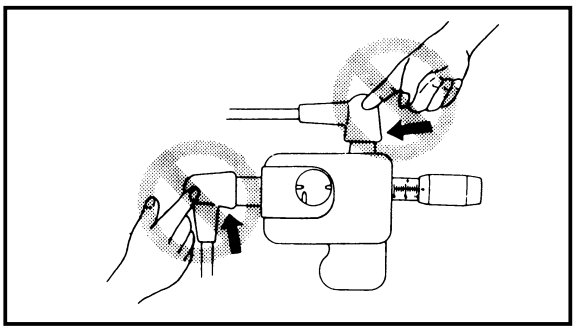
- Disconnect the coupler connections.
- Connect the test harness between the couplers.
- Connect the tester terminals to the terminals which are being checked.
- Run the engine and observe the measurement.

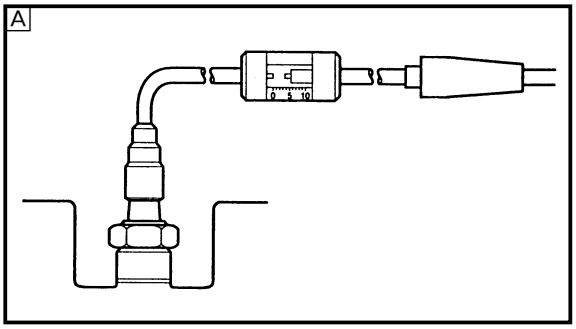
NOTE:

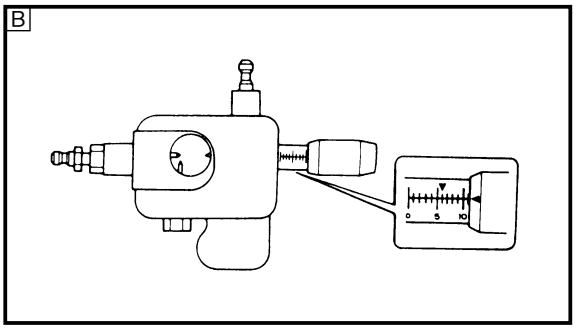
- Make sure the output lead (red lead) of the rectifier/regulator is disconnected when measuring the peak voltage of the lighting coil and rectifier/regulator.
- If the lighting coil and pickup coil(s) are measured unloaded, disconnect the test harness on the output side coupler.

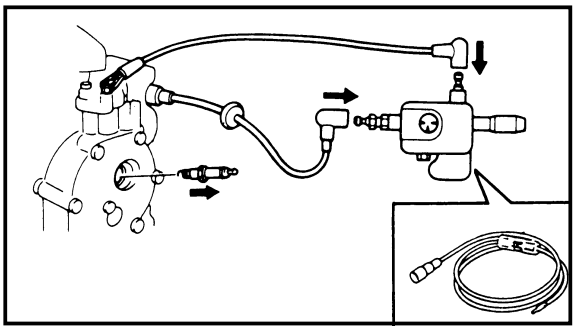
IGNITION SYSTEM
WIRING DIAGRAM

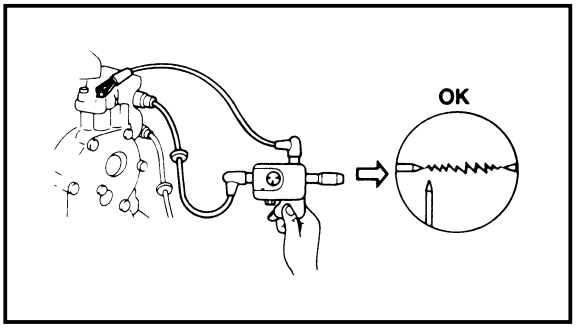












IGNITION SPARK GAP

⚠ WARNING

- **When checking the spark gap, do not touch any of the connections of the spark gap tester lead wires.**
- **When performing the spark gap test, take special care not to let sparks leak out of the removed spark plug cap.**
- **When performing the spark gap check, keep flammable gas or liquids away, since this test can produce sparks.**

1. Check:
   - Ignition spark gap
     Below specification → Continue to check the CDI unit output.

Spark gap:
10 mm (0.39 in)

Checking steps:
- Remove the spark plugs from the engine.
- Connect the spark plug cap to the spark gap tester.
- Set the spark gap length on the adjusting knob.

Spark gap tester:
YM-34487/90890-06754

- Crank the engine and observe the ignition system spark through the discharge window.

A For USA and CANADA
B For worldwide

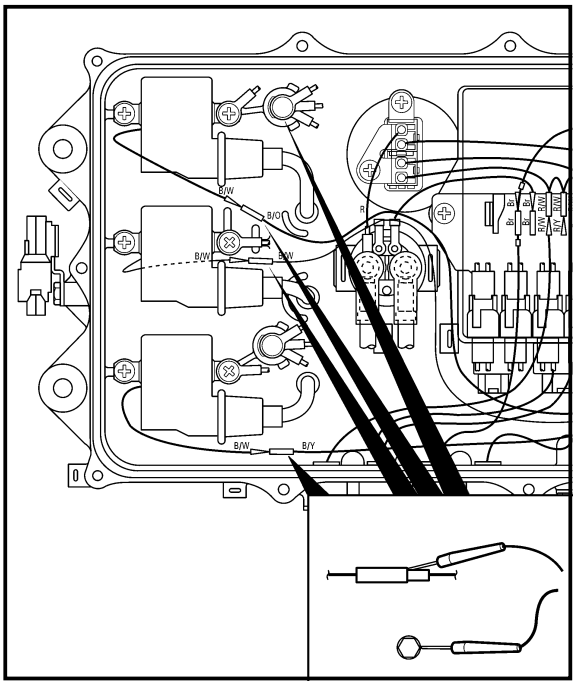
IGNITION SYSTEM PEAK VOLTAGE

⚠ WARNING

When checking the CDI unit do not touch any of the connections of the digital tester lead wires.

NOTE:

- If there is no spark, or the spark is weak, continue with the ignition system test.
- If a good spark is obtained, the problem is not with the ignition system, but possibly with the spark plug(-s) or another component.



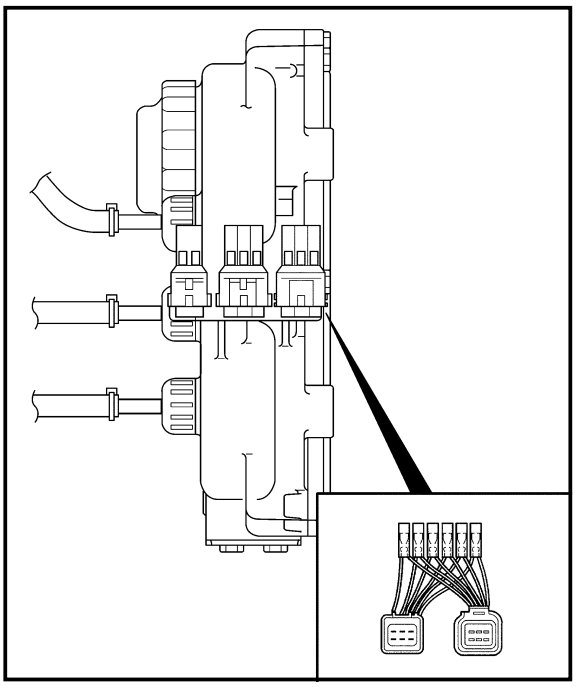
1. Measure:
   - CDI unit output peak voltage
     Above specification → Replace the ignition coil.
     Below specification → Measure the rectifier output peak voltage.
     Replace the CDI unit.

CDI unit output peak voltage:
Black/Orange (B/O) – Black (B):
Black/White (B/W) – Black (B):
Black/Yellow (B/Y) – Black (B):
200 V @ cranking 1
180 V @ cranking 2
190 V @ 2,000 r/min
180 V @ 3,500 r/min

Cranking 1: unloaded
Cranking 2: loaded

NOTE:

B/O – B for cylinder #1.
B/W – B for cylinder #2.
B/Y – B for cylinder #3.



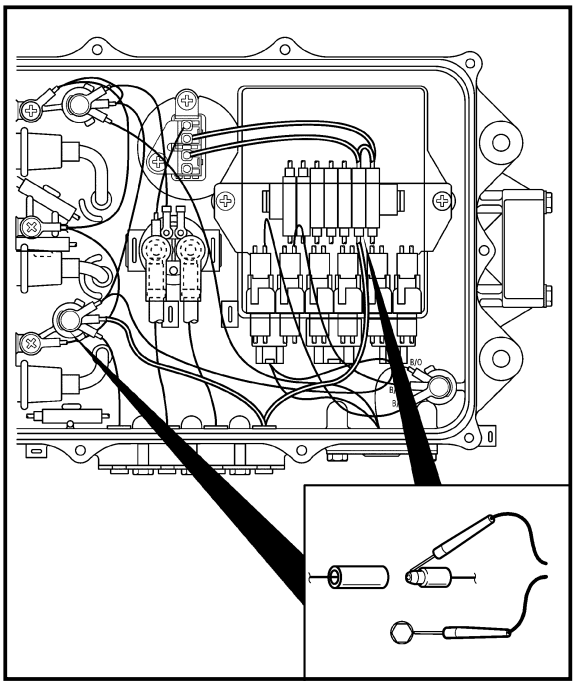
2. Measure:
   - Pick-up coil output peak voltage
     Below specification → Replace the pick-up coil.

Pick-up coil output peak voltage:
White/Red (W/R) – Black/Orange (B/O):
5 V @ cranking 1
2.8 V @ cranking 2
7.9 V @ 2,000 r/min
11 V @ 3,500 r/min

NOTE:
The starter motor will not operate when the test harness on the output side coupler is disconnected to measure the unloaded peak voltage for the pickup coil(s) and lighting coil. Therefore, connect the black lead of the test harness to the ground with a lead.

3. Measure:
   - Lighting coil output peak voltage
     Below specification → Replace the lighting coil.

Lighting coil output peak voltage:
Green (G) – Green (G):
9 V @ cranking 1
9 V @ cranking 2
14 V @ 2,000 r/min
14 V @ 3,500 r/min



4. Measure:
   - Rectifier output peak voltage
     Below specification → Replace the rectifier/regulator.

Rectifier output peak voltage:
Red (R) – Black (B):
7 V @ cranking 2
12.6 V @ 2,000 r/min
12.6 V @ 3,500 r/min

Cranking 1: unloaded
Cranking 2: loaded

BATTERY

Refer to “ELECTRICAL” in chapter 3.

FUSE

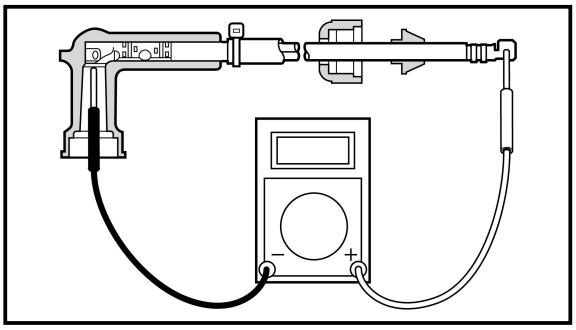
Refer to “STARTING SYSTEM”.

SPARK PLUGS

Refer to “ELECTRICAL” in chapter 3.

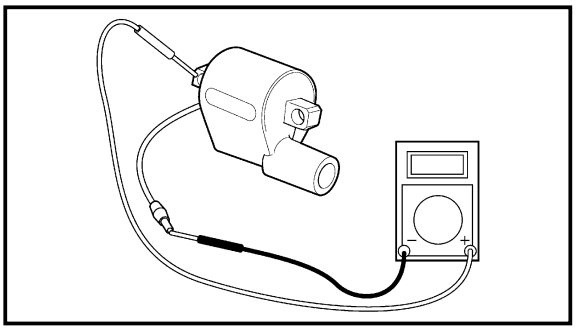
SPARK PLUG LEAD ASSEMBLY

1. Inspect:
   - Spark plug lead assembly
     Cracks/damage → Replace.



2. Measure:
   - Spark plug lead resistance
     Out of specification → Replace.

Spark plug lead resistance:
#1: 6.1 ~ 14.3 kΩ
#2: 4.6 ~ 11.1 kΩ
#3: 3.1 ~ 7.7 kΩ



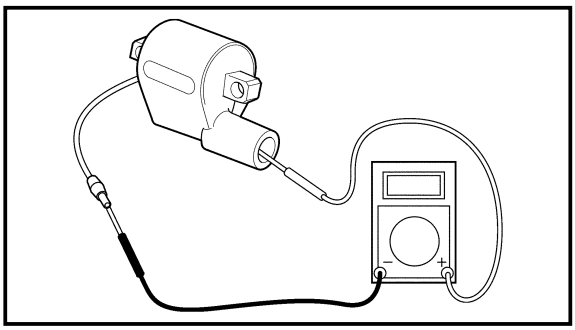
IGNITION COIL

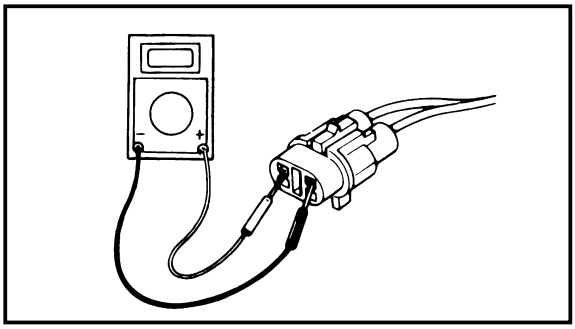
1. Measure:
   - Primary coil resistance
     Out of specification → Replace.

Primary coil resistance:
Black/White (B/W) – Body
0.26 ~ 0.36 Ω at 20 ˚C (68 ˚F)

NOTE:

When measuring a resistance of 10 Ω or less with the digital tester, the correct measurement cannot be obtained because of the tester’s internal resistance.
Refer to “Low resistance measurement”.





2. Measure:
   - Secondary coil resistance
     Out of specification → Replace.

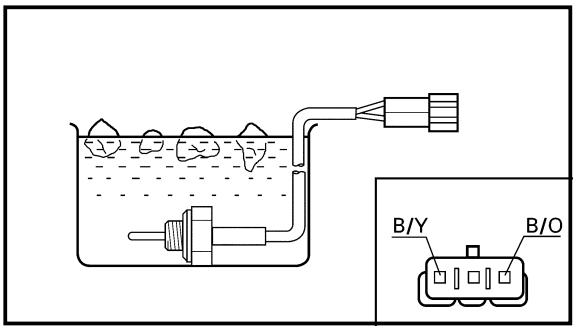
Secondary coil resistance:
Black/White (B/W) – Spark plug lead terminal
3.5 ~ 4.7 kΩ at 20 °C (68 °F)

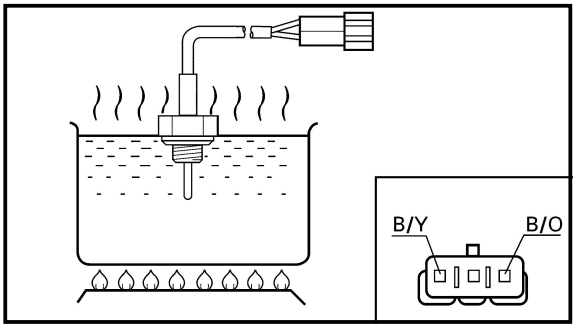
ENGINE STOP SWITCH

1. Check:
   - Engine stop switch continuity
     Out of specification → Replace.

Engine stop switch continuity (black coupler)

Lock plate	Position	Lead color	
		White	Black
Installed	Free		
	Push	○——	——○
Removed	Free	○——	——○
	Push	○——	——○



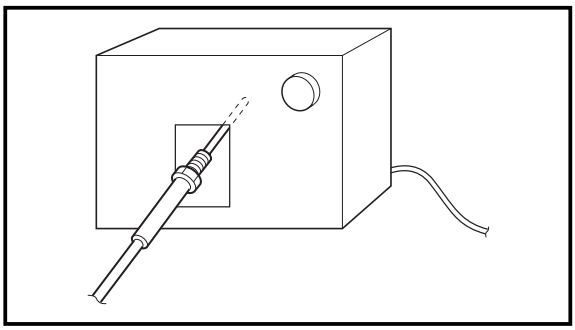


WATER TEMPERATURE SENSOR

1. Measure:
   - Water temperature sensor resistance (at the specified temperature)
     Out of specification → Replace.

Water temperature sensor resistance:
0 °C (32 °F): 24.0 ~ 37.1 kΩ
100 °C (212 °F): 0.87 ~ 1.18 kΩ
200 °C (392 °F): 0.104 ~ 0.153 kΩ

Measurement steps:
- Ice the water temperature sensor and measure the resistance.
- Suspend the water temperature sensor in a container filled with oil.
- Slowly heat the oil.
- Measure the resistance when the specified temperature is reached.



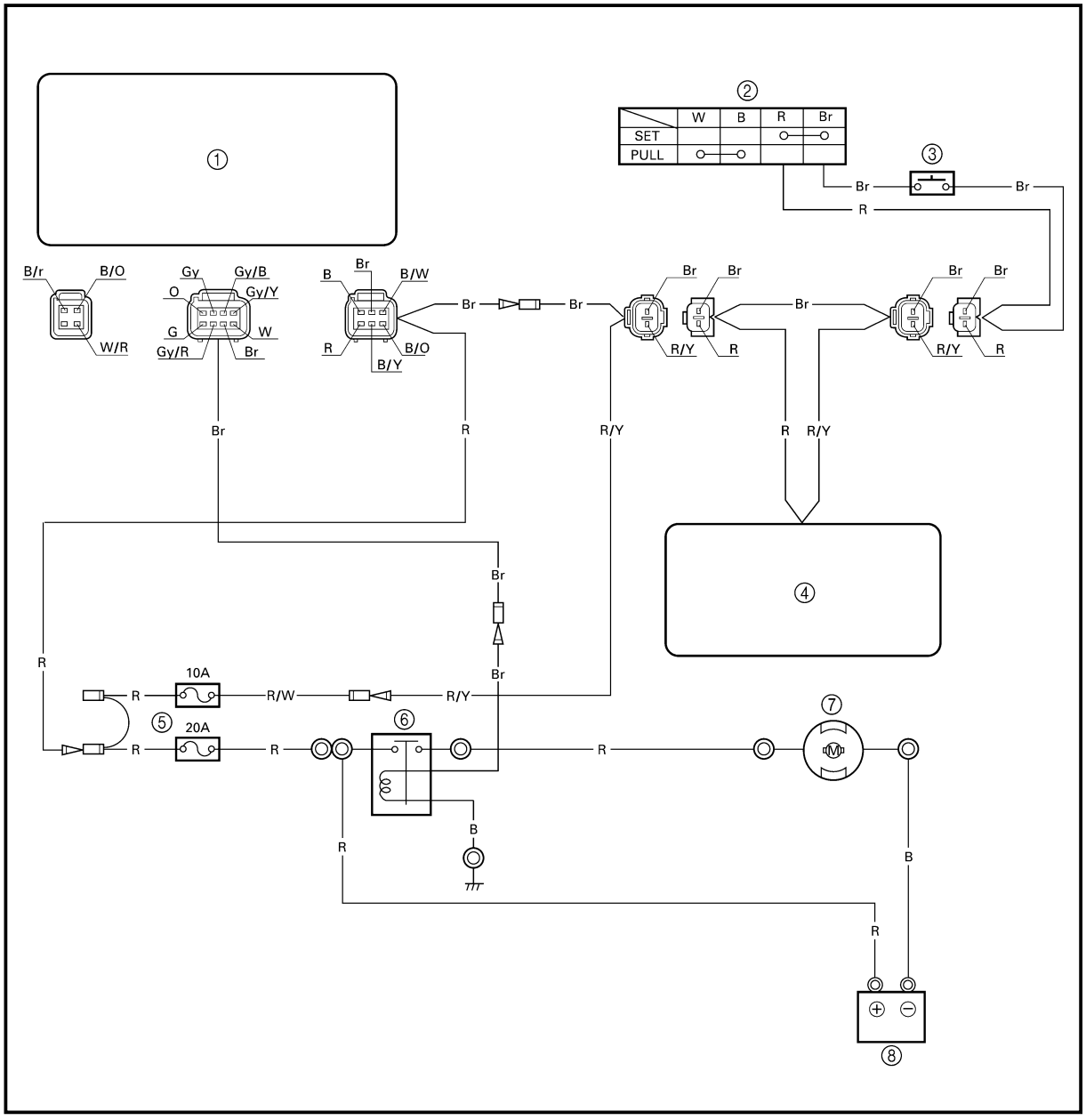
EXHAUST TEMPERATURE SENSOR

1. Measure:
   - Exhaust temperature sensor resistance (at the specified temperature)
     Out of specification → Replace.

Exhaust temperature sensor resistance:
300 °C (572 °F): 73 ~ 241 kΩ
600 °C (1,112 °F): 0.86 ~ 1.58 kΩ
900 °C (1,652 °F): 64 ~ 90 Ω

Measurement steps:
- Heat the exhaust temperature sensor using an electric furnace or equivalent.
- Measure the resistance when the specified temperature.

STARTING SYSTEM
WIRING DIAGRAM



① CDI unit
② Engine stop lanyard switch
③ Starter switch
④ Multi-function meter
⑤ Fuse
⑥ Starter relay
⑦ Starter motor
⑧ Battery

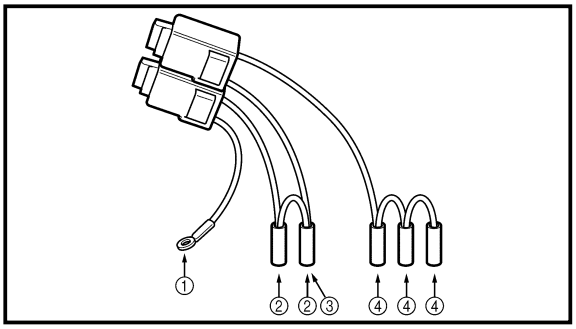
B : Black
Br : Brown
R : Red
R/Y : Red/Yellow

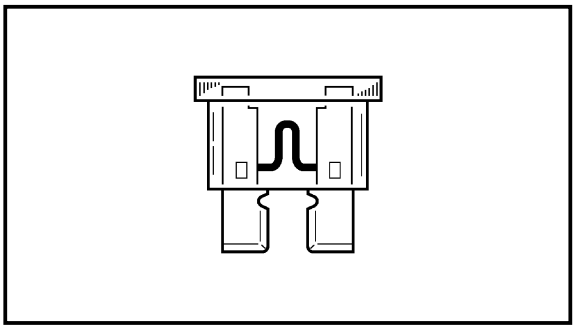
BATTERY

Refer to "ELECTRICAL" in chapter 3.

WIRING CONNECTIONS

1. Check:
   - Wiring connections
     Poor connections → Properly connect.





FUSE

1. Check:
   - Fuse holder continuity
     No continuity → Check the fuse or replace the fuse holder.

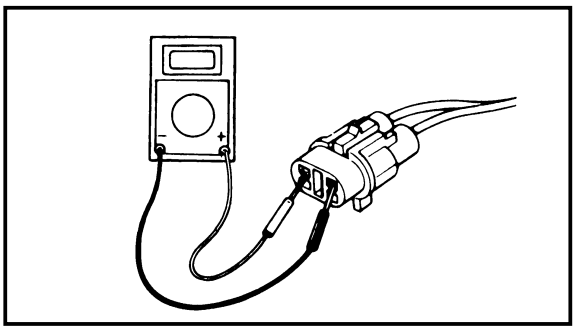
Fuse holder continuity:
Between ① and ②
Between ③ and ④

2. Check:
   - Fuse broken
     Broken → Replace.

Fuse rating:
10A, 20A

NOTE:

20A fuse is for CDI unit and rectifier/regulator.
10A fuse is for multi-function meter, YPVS motor and start switch.



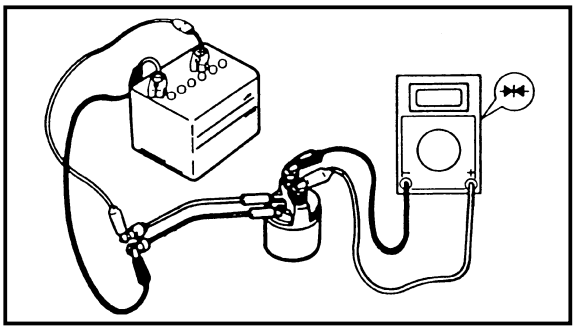
STARTER SWITCH

1. Check:
   - Continuity
     Out of specification → Replace.

Starter continuity (red coupler)			
Lock plate	Position	Leads	
		Red	Brown
Installed	Free		
	Push	○	○
Removed	Free		
	Push		

STARTER RELAY

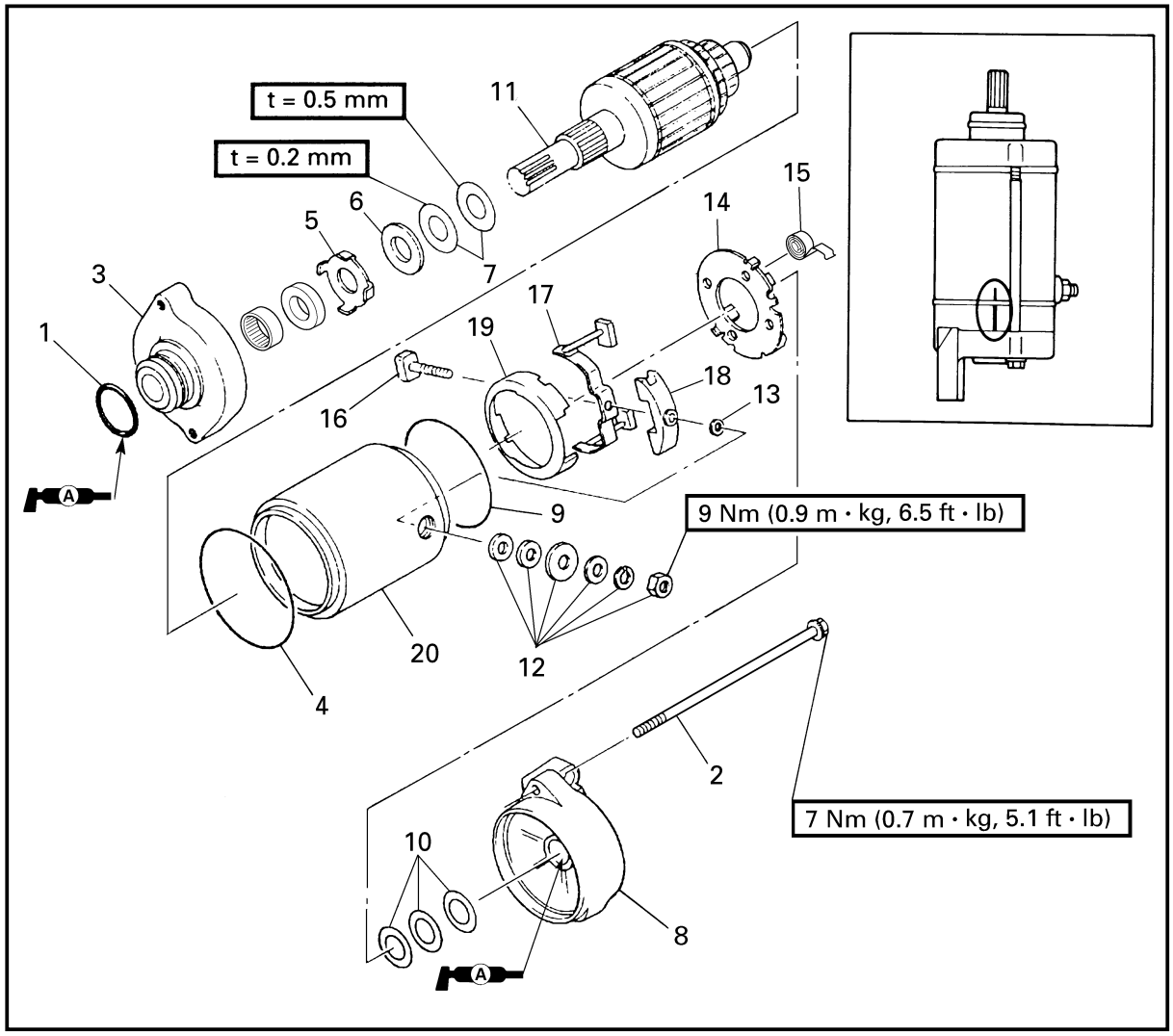
1. Inspect:
   - Brown lead terminal
   - Black lead terminal
     Loose → Tighten.



2. Check:
   - Starter relay
     Faulty → Replace.

Checking steps:
- Connect the tester leads between the starter relay terminals as shown.
- Connect the brown lead terminal to the positive battery terminal.
- Connect the black lead terminal to the negative battery terminal.
- Check that there is continuity between the starter relay terminals.
- Check that there is no continuity after the brown or black lead is removed.

STARTER MOTOR
EXPLODED DIAGRAM

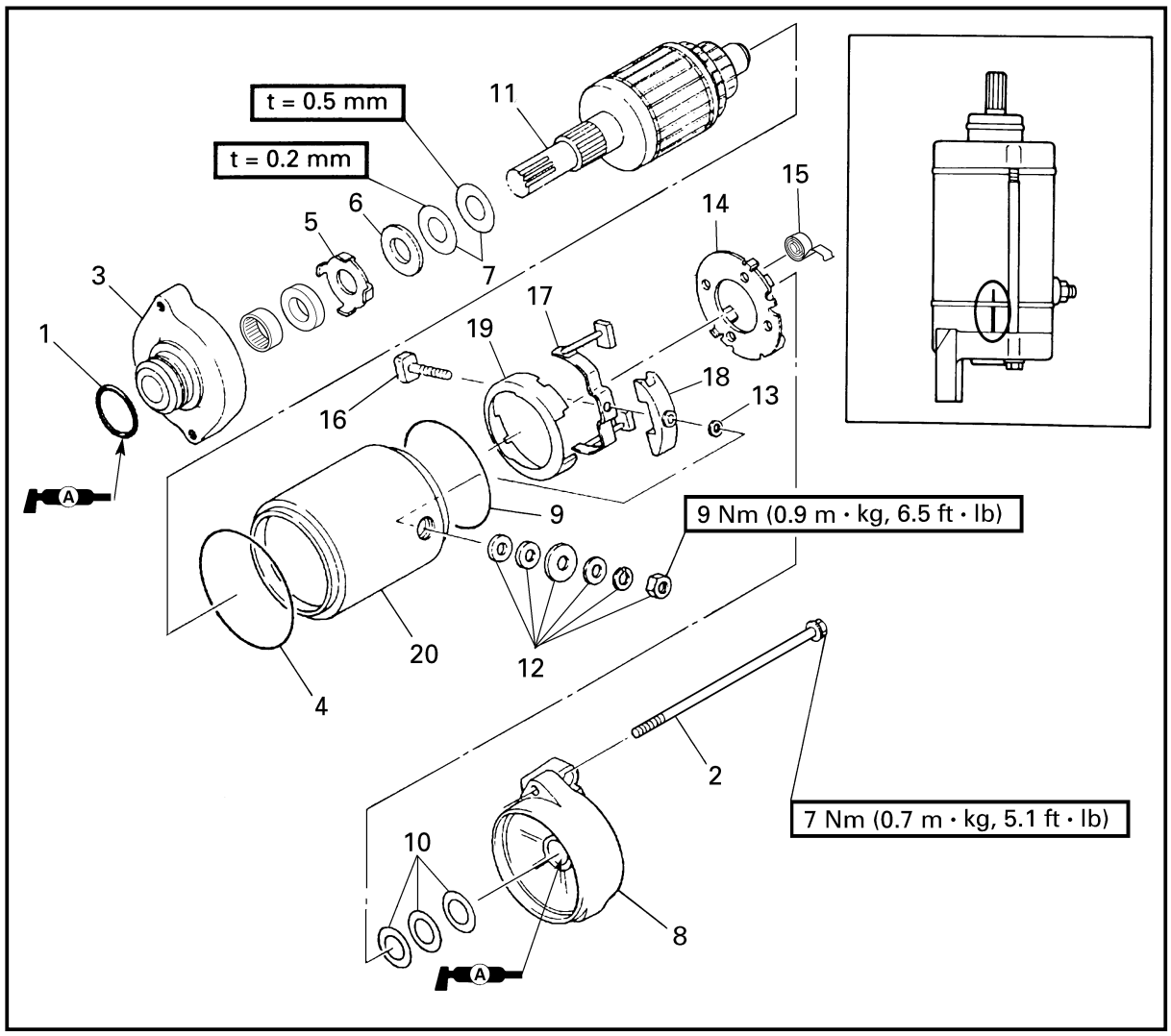


REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	STARTER MOTOR DISASSEMBLY		Follow the left "Step" for disassembly.
	Starter motor		Refer to "GENERATOR AND STARTER MOTOR" in chapter 5.
1	O-ring	1	
2	Bolt	2	
3	Starter motor front cover	1	
4	O-ring	1	
5	Oil seal retainer	1	
6	Washer	1	
7	Shim	*	t = 0.2 mm, 0.5 mm

*: As required

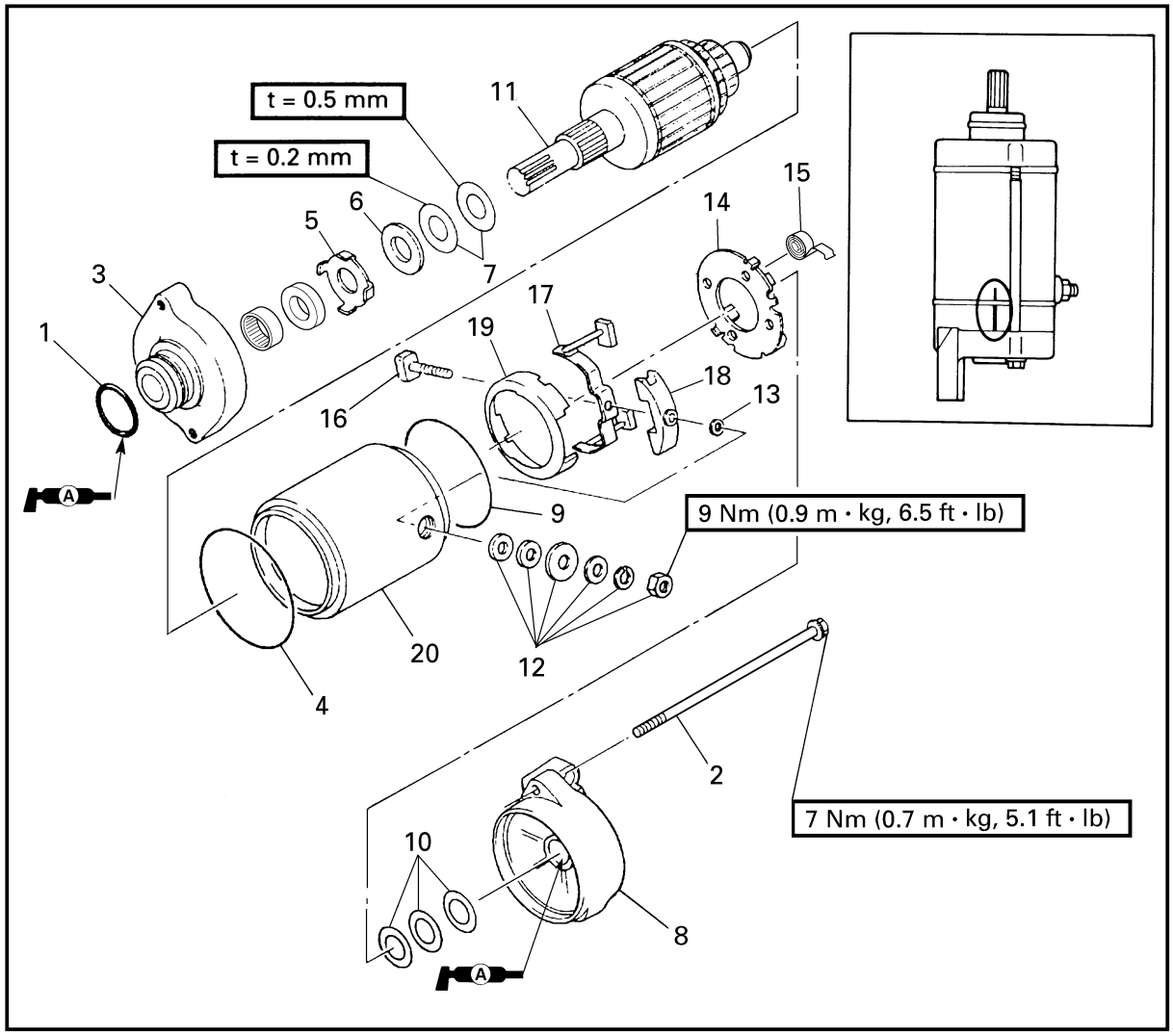
EXPLODED DIAGRAM



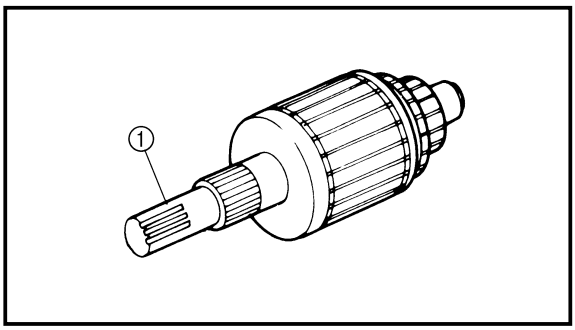
Step	Procedure/Part name	Q'ty	Service points
8	Starter motor rear cover	1	
9	O-ring	1	
10	Shim	*	t = 0.2 mm, 0.8 mm
11	Armature assembly	1	
12	Nut/spring washer/washer	1/1/4	
13	O-ring	1	
14	Brush holder	1	
15	Brush spring	4	
16	Bolt	1	
17	Brush assembly	1	

*: As required

EXPLODED DIAGRAM



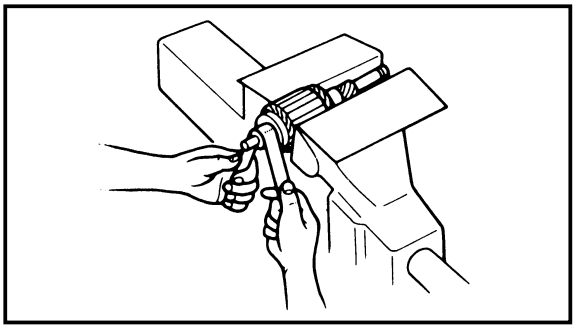
Step	Procedure/Part name	Q'ty	Service points
18	Spacer	1	
19	Holder	1	
20	Starter motor yoke	1	
			Reverse the disassembly steps for assembly.



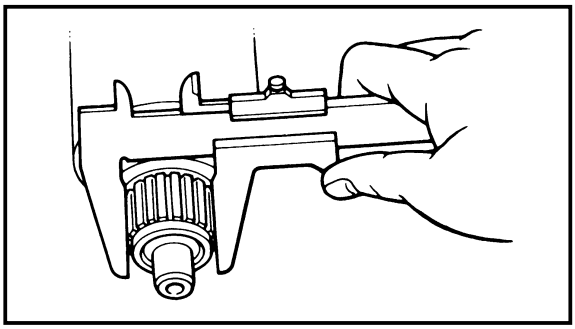
SERVICE POINTS

Armature inspection

1. Inspect:
   - Armature shaft ①
     Damage/wear → Replace.

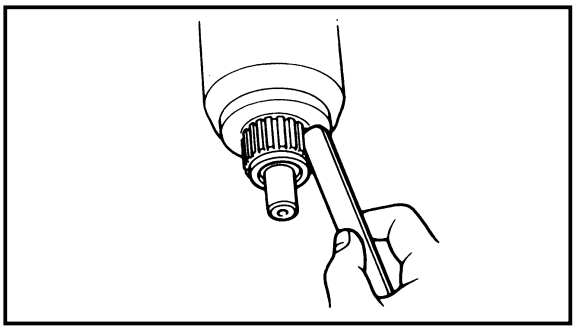


2. Inspect:
   - Commutator
     Dirt → Clean with 600 grit sandpaper.



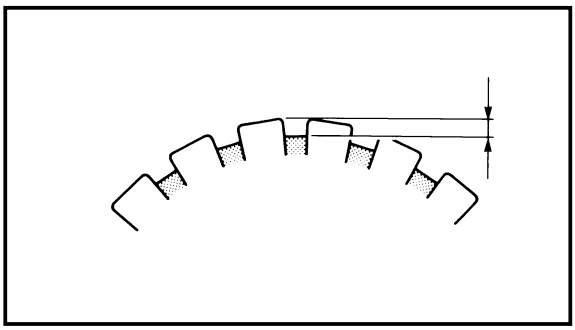
3. Measure:
   - Commutator diameter
     Out of specification → Replace.

	Min. commutator diameter: 27.0 mm (1.06 in)



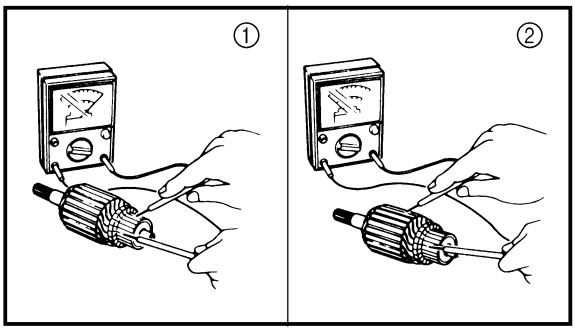
4. Check:
   - Commutator undercut
     Contaminants → Clean.

NOTE:
Remove all mica and metal particles with compressed air.



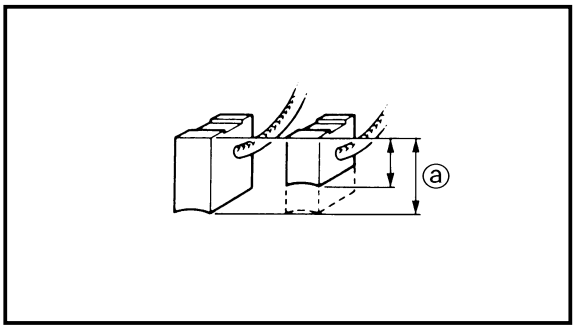
5. Measure:
   - Commutator undercut
     Out of specification → Replace.

	Min. commutator undercut: 0.2 mm (0.01 in)



6. Inspect:
   - Armature coil continuity
     Out of specification → Replace.

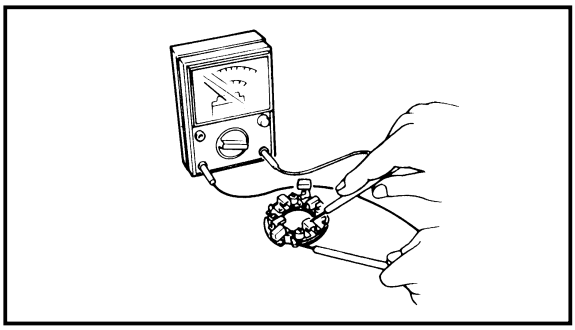
Armature coil continuity:	
Commutator segments ①	Continuity
Segment - Laminations ②	No continuity
Segment - Armature shaft	No continuity



Brush holder inspection

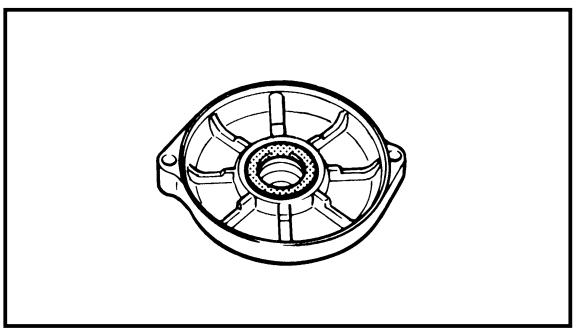
1. Measure:
   - Brush length ⓐ
     Out of specification → Replace.

Min. brush length: 6.5 mm (0.26 in)



2. Check:
   - Brush holder continuity
     Out of specification → Replace.

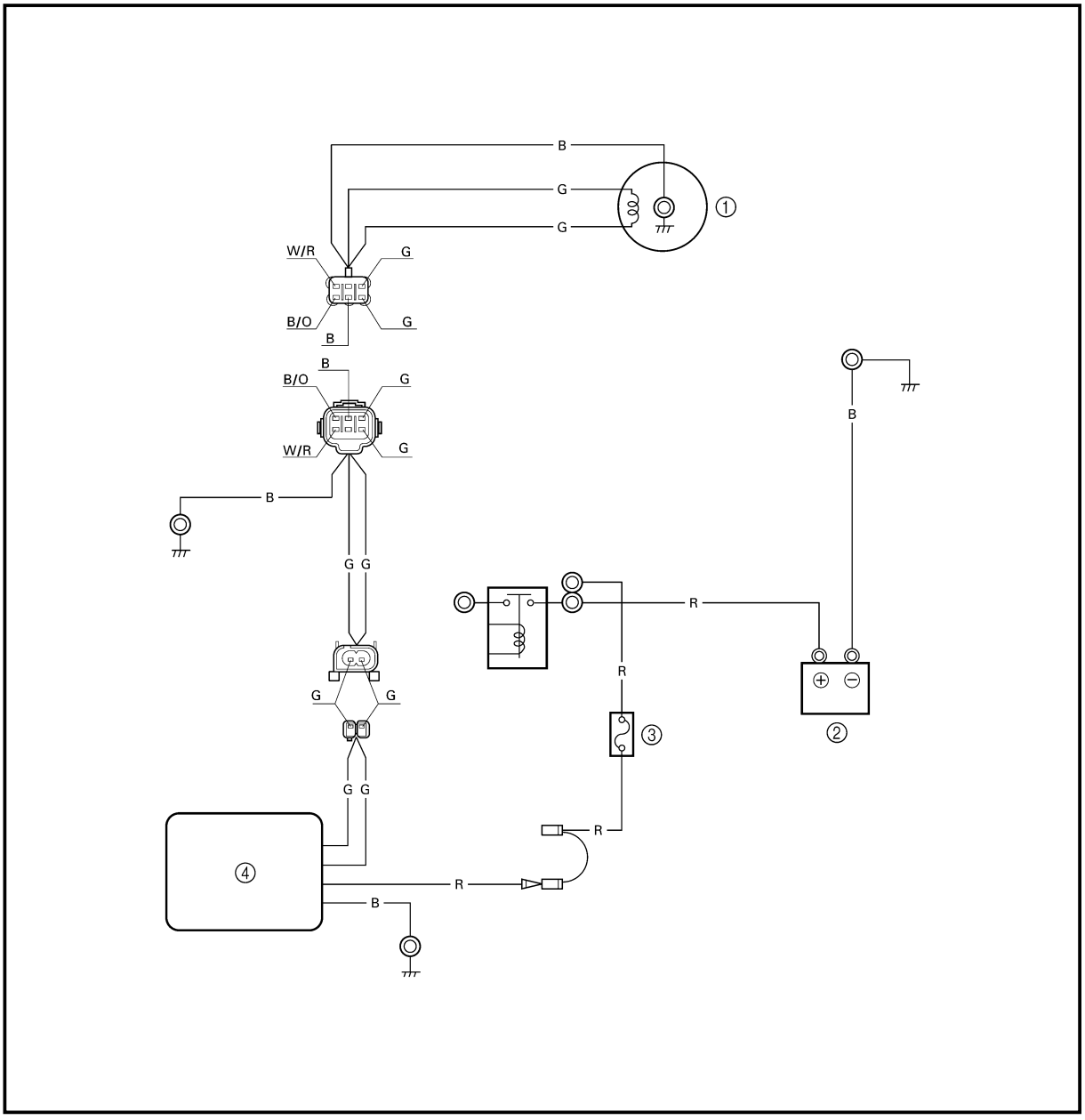
Brush holder continuity:	
Brush holder - Base	No continuity



Starter motor front cover inspection

1. Inspect:
   - Starter motor front cover bushing
     Damage/wear → Replace the starter motor front cover.

CHARGING SYSTEM
WIRING DIAGRAM



① Lighting coil
② Battery
③ Fuse (20A)
④ Rectifier/regulator

B : Black
G : Green
R : Red
G/W : Green/White

FUSE

Refer to “STARTING SYSTEM”.

BATTERY

Refer to “ELECTRICAL” in chapter 3.

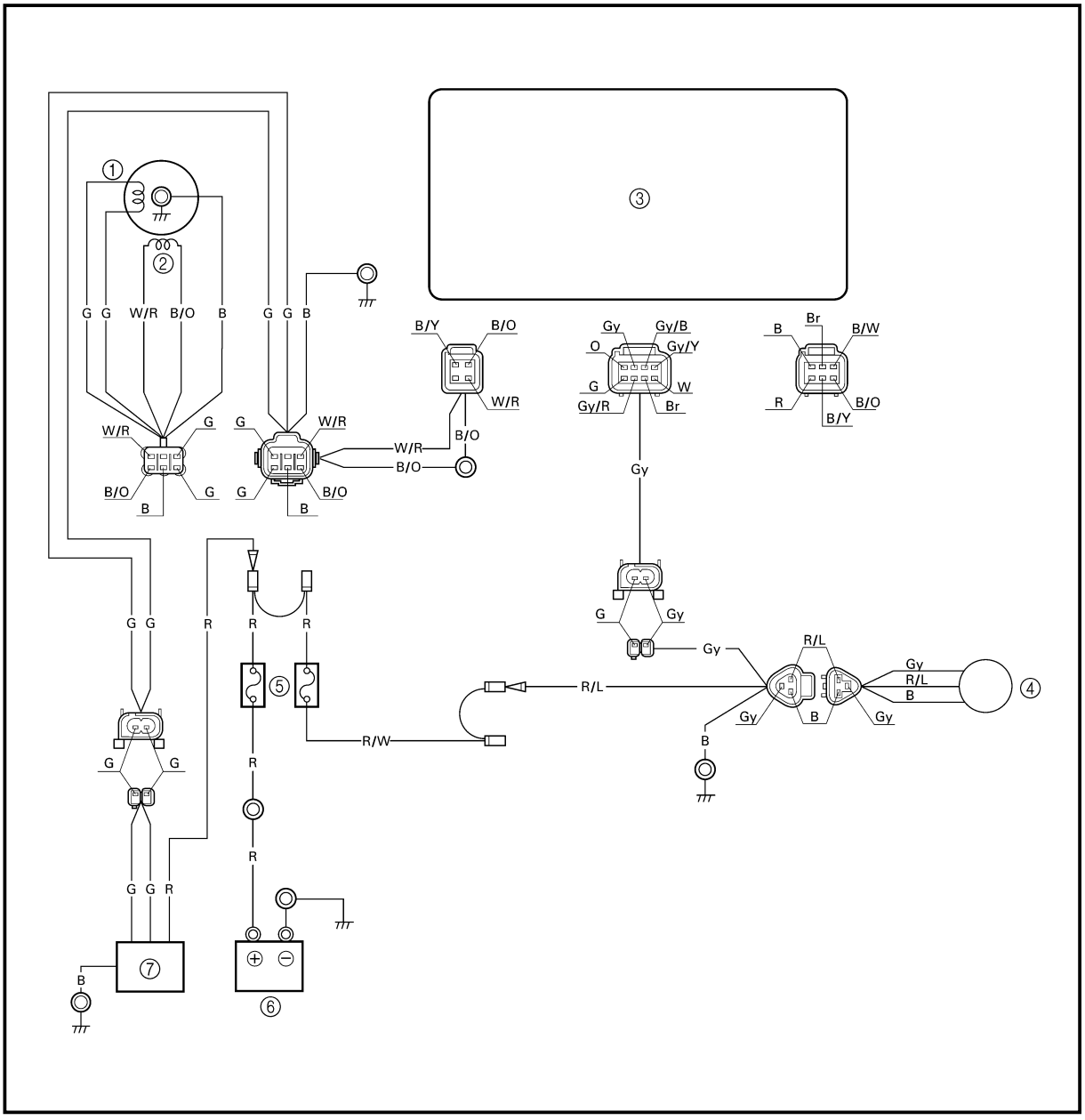
LIGHTING COIL

Refer to “IGNITION SYSTEM”.

RECTIFIER/REGULATOR

Refer to “IGNITION SYSTEM”.

YPVS
WIRING DIAGRAM



① Lighting coil
② Pickup coil
③ CDI unit
④ YPVS servomotor
⑤ Fuse
⑥ Battery
⑦ Rectifier/regulator

B : Black
Gy : Gray
R : Red
B/O : Black/Orange
R/L : Red/Blue
R/W : Red/White
W/R : White/Red

FUSE

Refer to “STARTING SYSTEM”.

BATTERY

Refer to “ELECTRICAL” in chapter 3.

PICKUP COIL

Refer to “IGNITION SYSTEM”.

CDI UNIT

Refer to “IGNITION SYSTEM”.

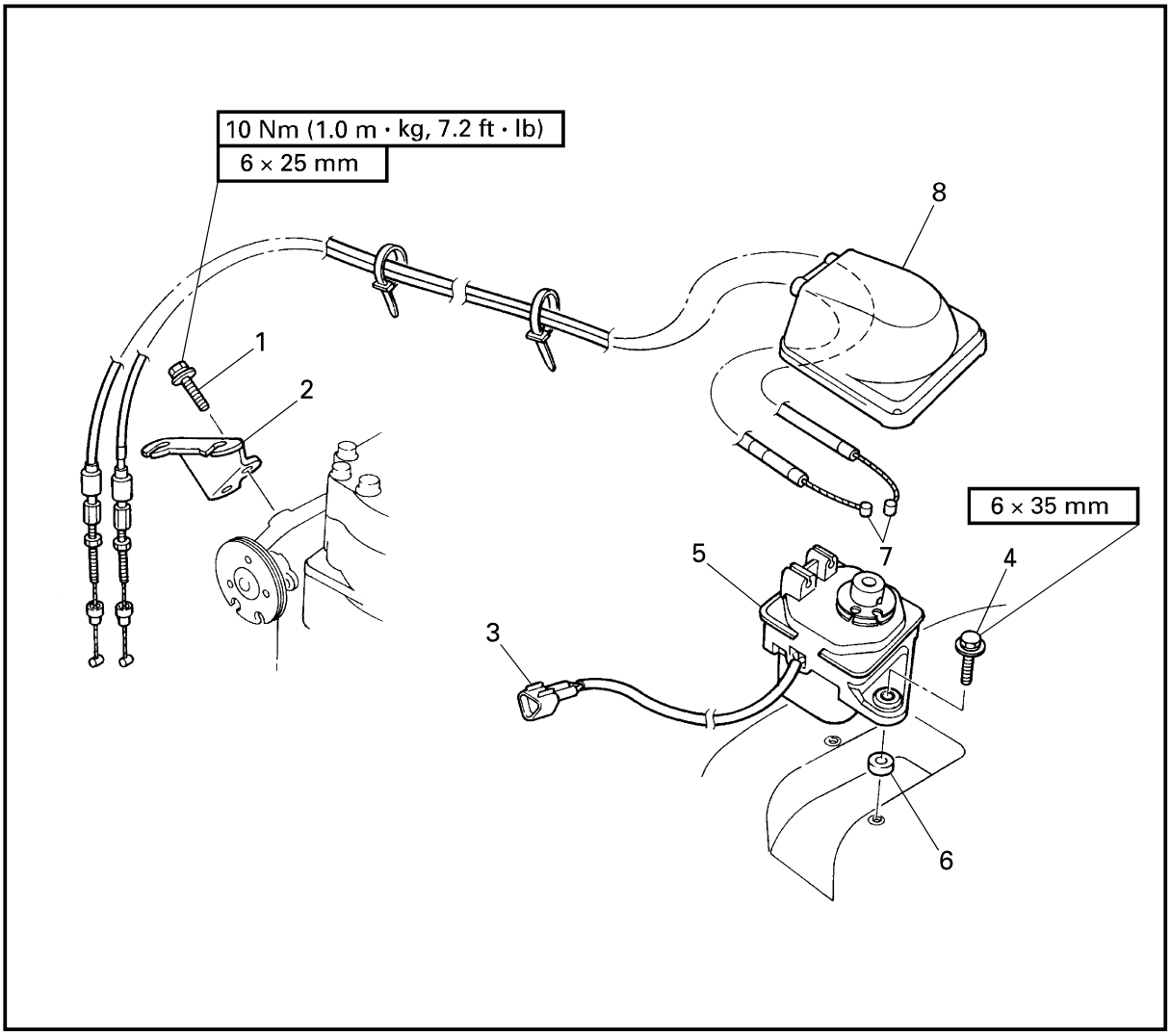
LIGHTING COIL

Refer to “IGNITION SYSTEM”.

RECTIFIER/REGULATOR

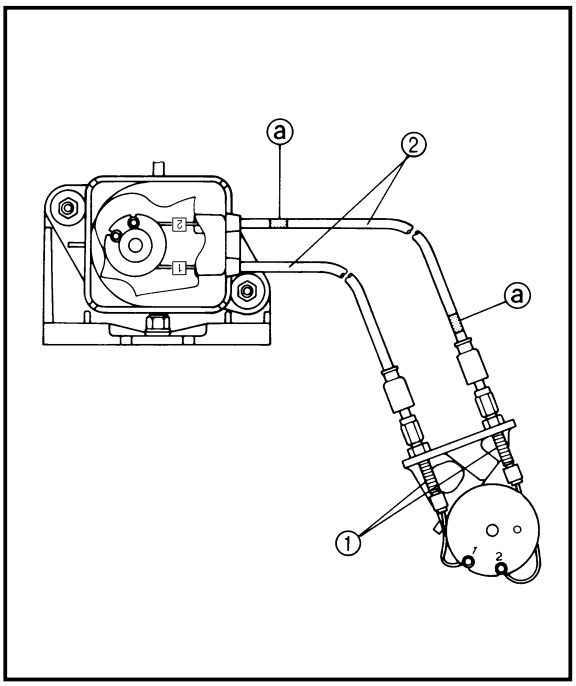
Refer to “IGNITION SYSTEM”.

YPVS SERVOMOTOR
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	YPVS SERVOMOTOR REMOVAL		Follow the left "Step" for removal.
1	Bolt	2	
2	Cable holder	1	
3	YPVS servomotor coupler	1	
4	Bolt	2	
5	YPVS servomotor	1	
6	Spacer	2	
7	YPVS cable	2	White tape is for No. 2 cable.
8	Cover	1	
			Reverse the removal steps for installation.



SERVICE POINTS

YPVS cable removal and installation

1. Remove:
   - YPVS cables 1 and 2

Removal steps:
- Remove the YPVS cable holder ①.
- Remove the YPVS cables ② from the both drams.

NOTE:

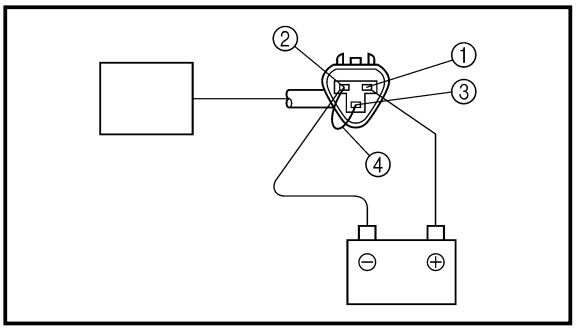
There is a white paint mark ⓐ on YPVS cable 2.

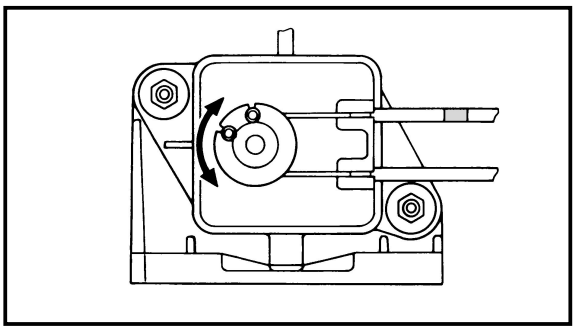
YPVS cable inspection

1. Inspect:
   - YPVS cables 1 and 2
     Frays/kinks/rough movement → Replace.

YPVS servomotor inspection

1. Check:
   - YPVS servomotor
     YPVS servomotor does not move → Replace.





Checking steps:
- Connect the battery (12 V) to the YPVS servomotor coupler as shown.

Battery positive terminal → Red (R) terminal ①
Battery negative terminal → Black (B) terminal ②

- Install a jumper lead ④ between the black ② and gray ③ terminals as shown. Only install the jumper lead for 1 or 2 seconds.

Black (B) terminal ② ↔ Gray (Gy) terminal ③

- Make sure the servomotor operates properly.

NOTE:

Make sure the pulley operates three seconds after the jumper lead is removed.

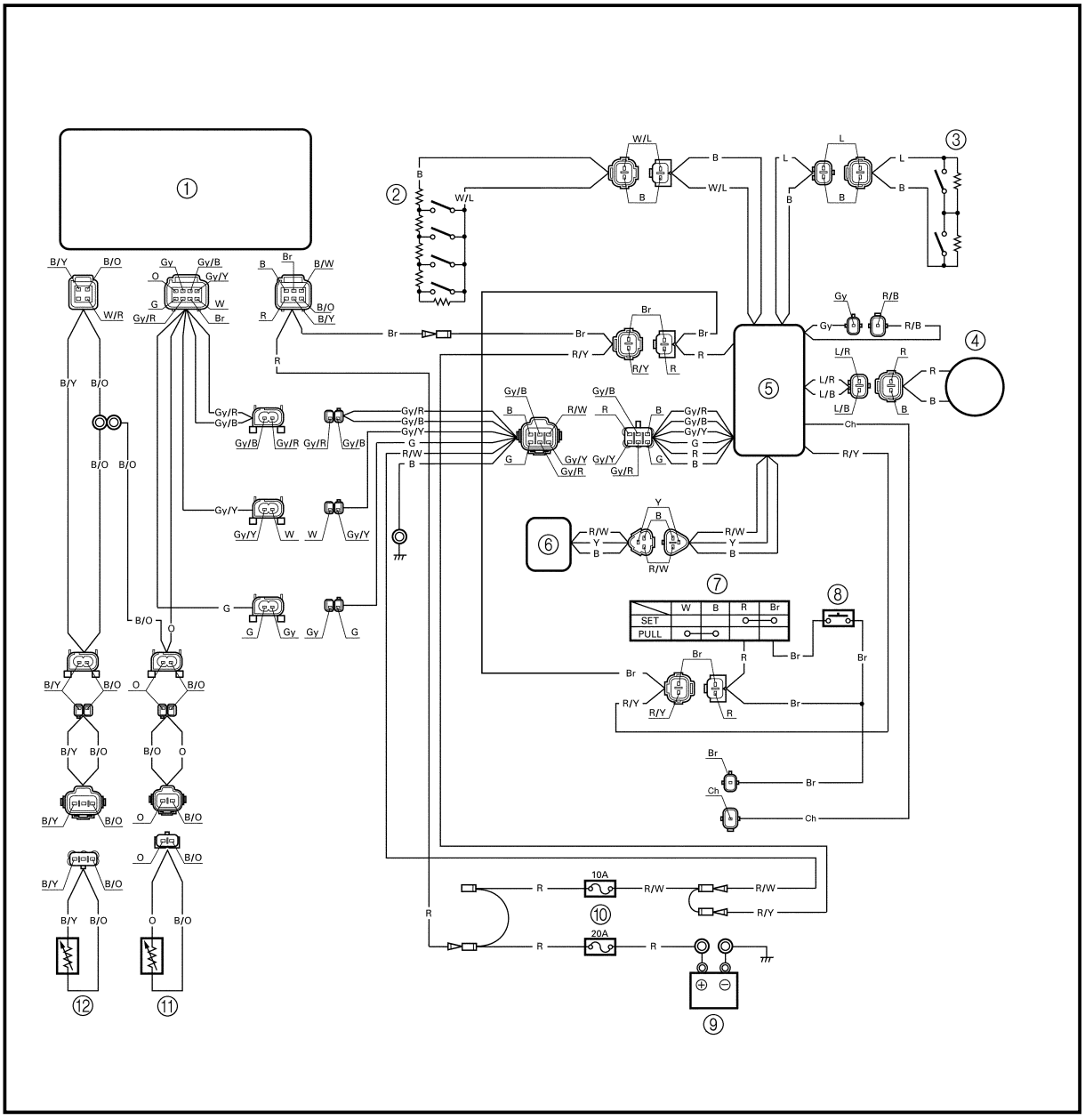
CAUTION:

Do not disassemble the YPVS servomotor unit. It is a sealed unit and if it is faulty it must be replaced.

YPVS cable adjustment

Refer to "CONTROL SYSTEM" in chapter 3.

INDICATION SYSTEM
WIRING DIAGRAM



① CDI unit
② Fuel level sensor
③ Oil level sensor
④ Buzzer
⑤ Multi-function meter
⑥ Speed sensor
⑦ Engine stop lanyard switch
⑧ Starter switch
⑨ Battery
⑩ Fuse
⑪ Exhaust temperature sensor
⑫ Water temperature sensor

B : Black
Br : Brown
Ch : Chocolate
G : Green
Gy : Gray
L : Blue
O : Orange
R : Red
Y : Yellow
B/O : Black/Orange
B/Y : Black/Yellow

Gy/B : Gray/Black
Gy/R : Gray/Red
Gy/Y : Gray/Yellow
L/B : Blue/Black
L/R : Blue/Red
R/B : Red/Black
R/W : Red/White
R/Y : Red/Yellow
W/L : White/Blue

FUSE

Refer to “STARTING SYSTEM”.

BATTERY

Refer to “ELECTRICAL” in chapter 3.

LIGHTING COIL

Refer to “CHARGING SYSTEM”.

RECTIFIER/REGULATOR

Refer to “CHARGING SYSTEM”.

CDI UNIT

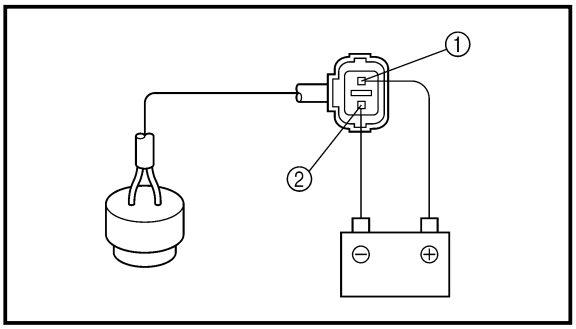
Refer to “IGNITION SYSTEM”.

WATER TEMPERATURE SENSOR

Refer to “IGNITION SYSTEM”.

EXHAUST TEMPERATURE SENSOR

Refer to “IGNITION SYSTEM”.



BUZZER

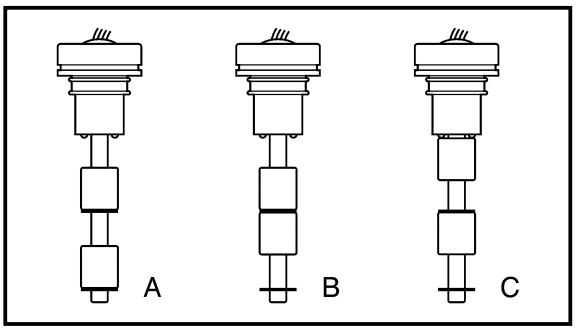
1. Check:
   - Buzzer
     Buzzer does not sound → Replace.

Checking steps:
- Connect the battery (12 V) to the buzzer coupler as shown.

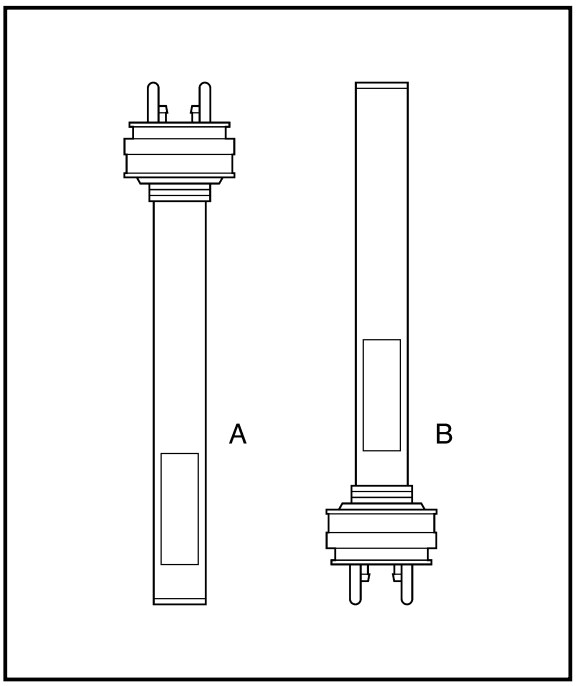
Battery positive terminal →
Red (R) terminal ①
Battery negative terminal →
Black (B) terminal ②

OIL LEVEL SENSOR

1. Measure:
   - Oil level sensor resistance
     Out of specification → Replace.



Blue (L) – Black (B)	
Float position	Resistance (Ω)
A	292 ~ 308
B	97 ~ 103
C	0 ~ 3



FUEL LEVEL SENSOR

1. Measure:
   - Fuel level sensor resistance
     Out of specification → Replace.

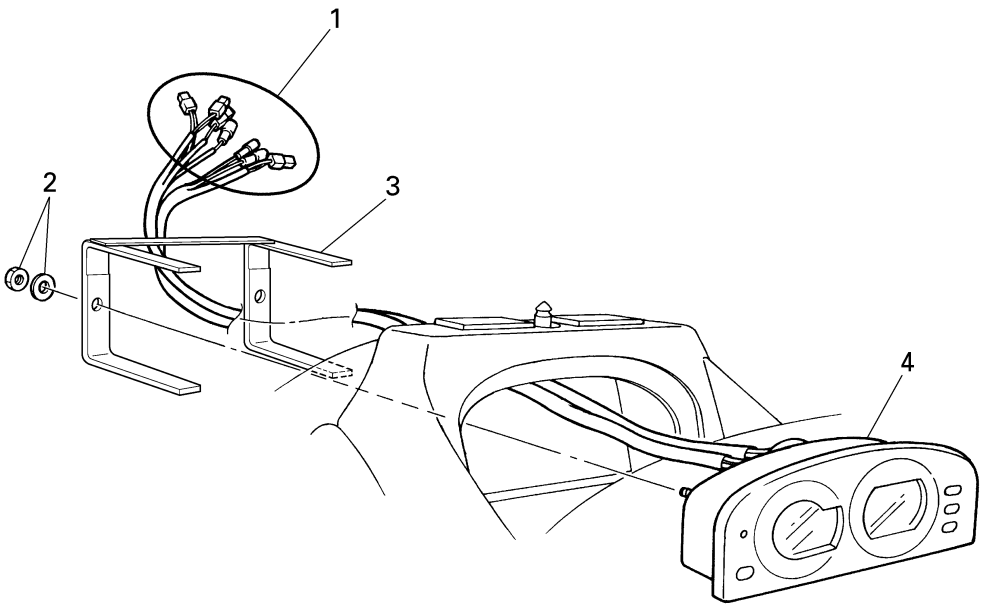
White/blue (W/L) – Black (B)	
Float position	Resistance (Ω)
A	757 ~ 803
B	0 ~ 8

MULTI-FUNCTION METER

Multi-function meter

1. Check:
   - Multi-function meter
     Cracked meter housing → Replace the multi-function meter.
     Meter is fogged/shows signs of water intrusion → Replace the multi-function meter.

EXPLODED DIAGRAM

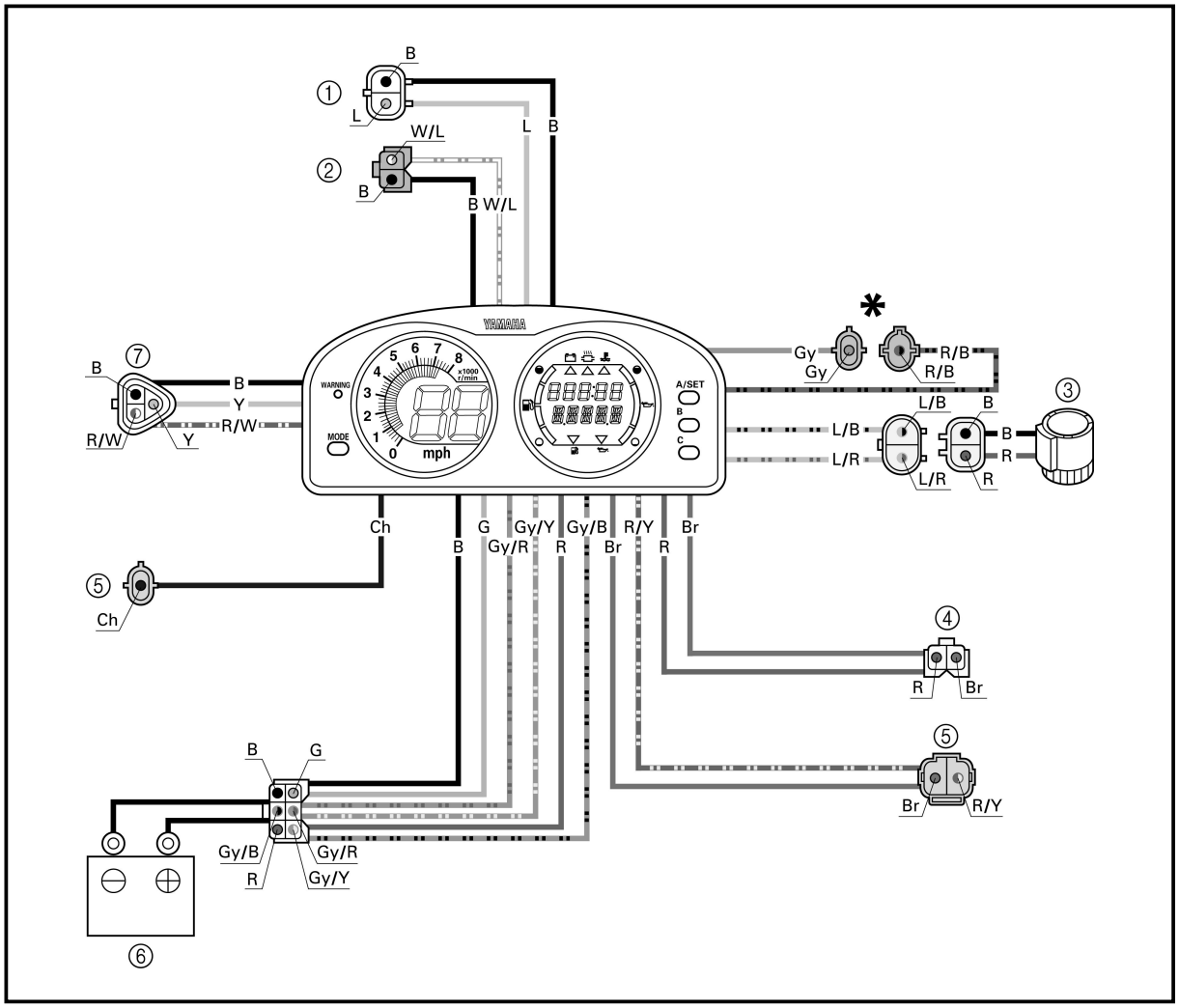


REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	MULTI-FUNCTION METER REMOVAL		Follow the left "Step" for removal.
1	Multi-function meter coupler	8	
2	Nut/washer	2/2	
3	Holder	1	
4	Multi-function meter	1	
			Reverse the removal steps for installation.

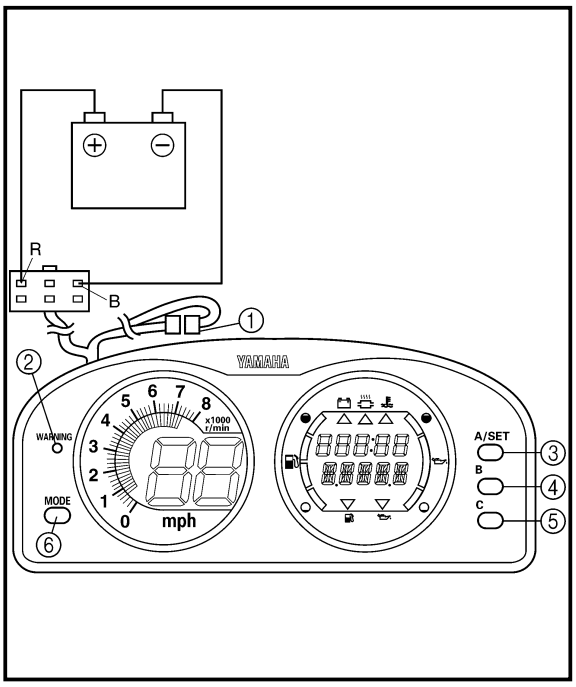
Display function

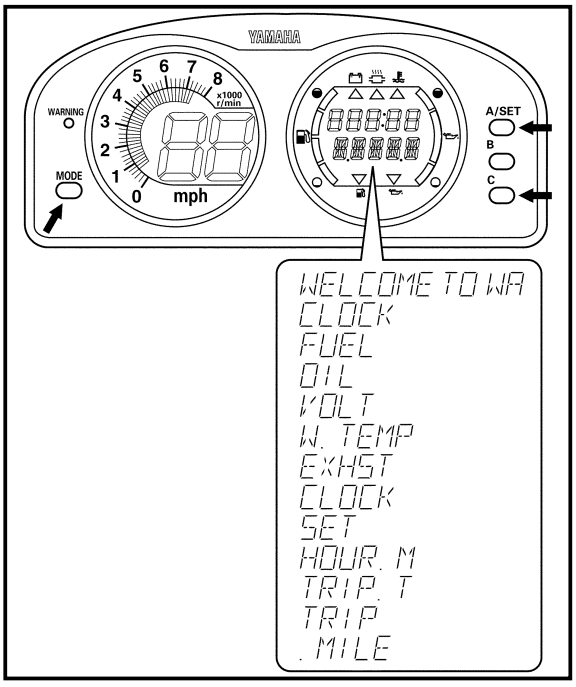
1. Check:
   - Display function
     Not operate → Replace the multi-function meter.



① Oil level sensor
② Fuel level sensor
③ Buzzer
④ Electrical box
⑤ Start switch
⑥ Battery
⑦ Speed sensor
*: Disconnected

B : Black
Br : Brown
Ch : Chocolate
G : Green
Gy : Gray
L : Blue
R : Red
Y : Yellow
Gy/B : Gray/Black
Gy/R : Gray/Red
Gy/Y : Gray/Yellow
L/B : Blue/Black
L/R : Blue/Red
R/B : Red/Black
R/W : Red/White
R/Y : Red/Yellow
W/L : White/Blue





Checking steps:

- Connect the battery terminals to the white six-pin connector as shown.

NOTE:

If the multi-function meter has been removed from the water vehicle, supply DC 12 voltage to the connector (+: red, –: black) with a battery.

- Disconnect the blue one-pin connector ① and make sure the "WARNING" lamp ② lights.

NOTE:

If the "WARNING" lamp does not light, disconnect the battery and then reconnect it.

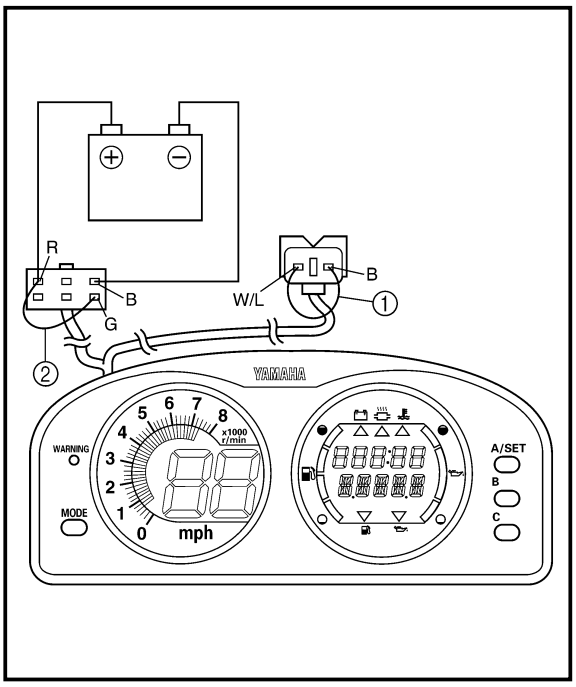
- Press the "A/SET" ③ and "C" ⑤ buttons at the same time. While still pressing the two buttons, press the "MODE" button ⑥ and hold all three for more than 3 seconds. The self-indicating function will then activate.

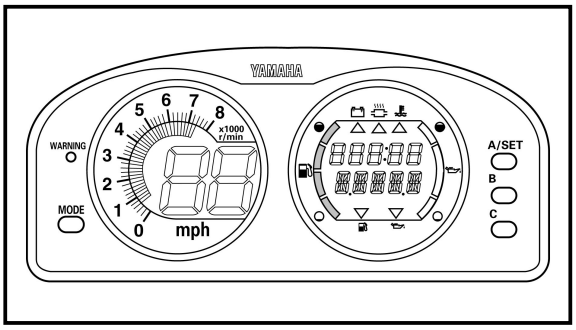
NOTE:

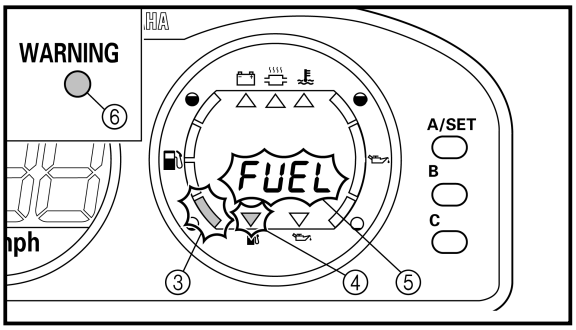
If the "CODE" message displays, reconnect and then disconnect the blue one-pin connector.

Sequential output (73 seconds/cycle)	
1	Display begins operation
2	"WELCOME TO WAVERUNNERS"
3	All LCD readouts turn on
4	"CLOCK" is displayed
5	"FUEL" is displayed
6	"OIL" is displayed
7	"VOLT" is displayed
8	"W.TEMP" is displayed
9	"EXHST" is displayed
10	"CLOCK" is displayed
11	"SET" is displayed
12	"HOUR. M" is displayed
13	"TRIP.T" is displayed
14	"TRIP" is displayed
15	".MILE" is displayed

- Press either button ③, ④, ⑤, or ⑥. The self-indicating function will then stop and the "WARNING" lamp ② will light.
- Reconnect the blue one-pin connector. The "WARNING" lamp ② will turn off.







Fuel level gauge

1. Check:
   - Fuel level gauge
     Not operating → Replace the multi-function meter.

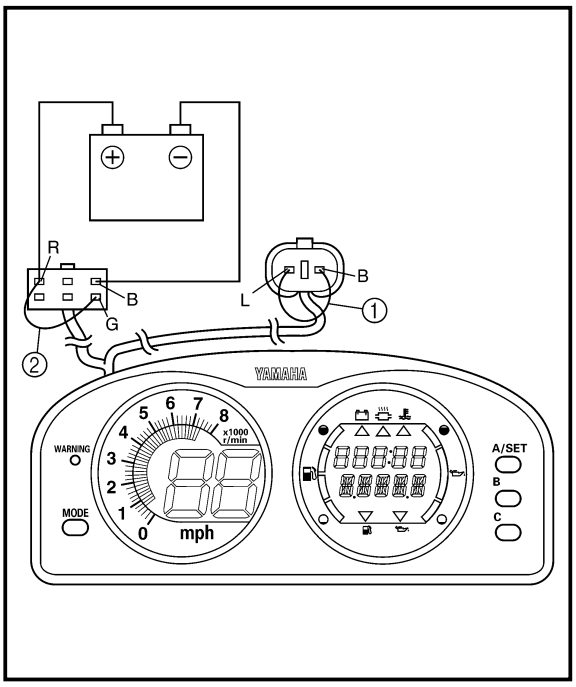
Checking steps:

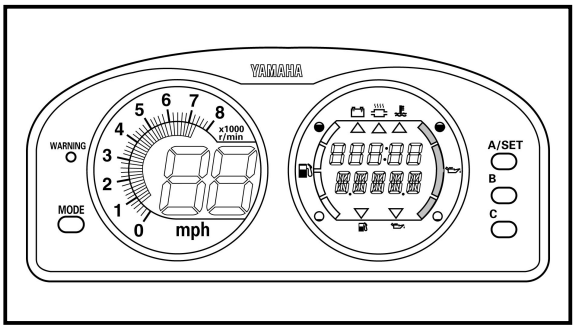
- Supply DC 12 voltage to the white six-pin connector (+: red, –: black) with a battery.
- Disconnect the green two-pin connector (white/blue and black leads).
- Connect the white/blue and black terminals with a jumper lead ①.
- Connect the green and red terminals with a jumper lead ②.

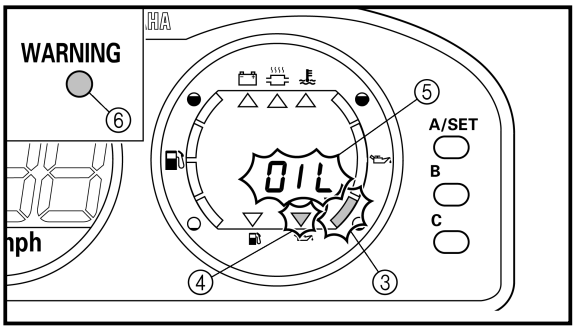
NOTE:

If the jumper lead is installed for more than 30 seconds, the display will automatically turn off.

- Check the fuel level segments is full indicated.
- Remove the jumper lead from the green two-pin connector.
- Disconnect the jumper lead ② and then connect it to green and red terminal again.
- Make sure the fuel low level segment ③, fuel level warning indicator ④ and "FUEL" message ⑤ blinks, and the "WARNING" lamp ⑥ operates properly, and the buzzer sounds intermittently.







Oil level gauge

1. Check:
   - Oil level gauge
     Not operating → Replace the multi-function meter.

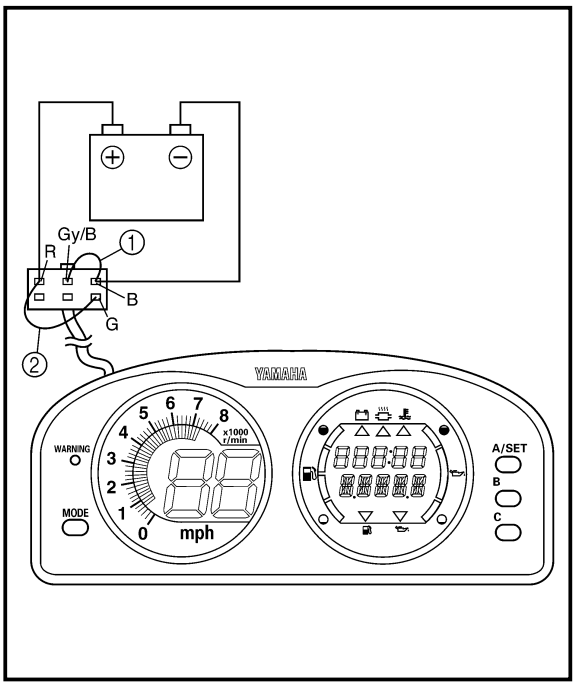
Checking steps:

- Supply DC 12 voltage to the white six-pin connector (+: red, –: black) with a battery.
- Disconnect the white two-pin connector (blue and black leads).
- Connect the blue and black terminals with a jumper lead ①.
- Connect the green and red terminals with a jumper lead ②.

NOTE:

If the jumper lead is installed for more than 30 seconds, the display will automatically turn off.

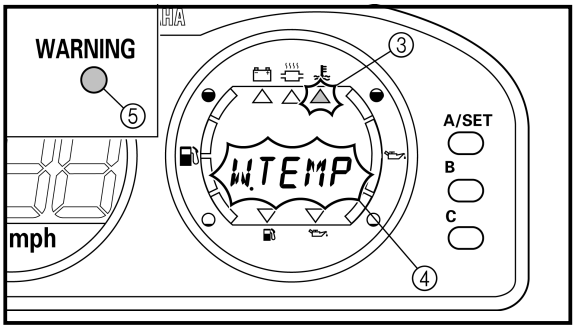
- Check the oil level segments is full indicated.
- Remove the jumper lead from the white two-pin connector.
- Disconnect the jumper lead ② and then connect it to green and red terminal again.
- Make sure the oil low level segment ③, oil level warning indicator ④ and "OIL" message ⑤ blinks, and the "WARNING" lamp ⑥ operates properly, and the buzzer sounds intermittently.

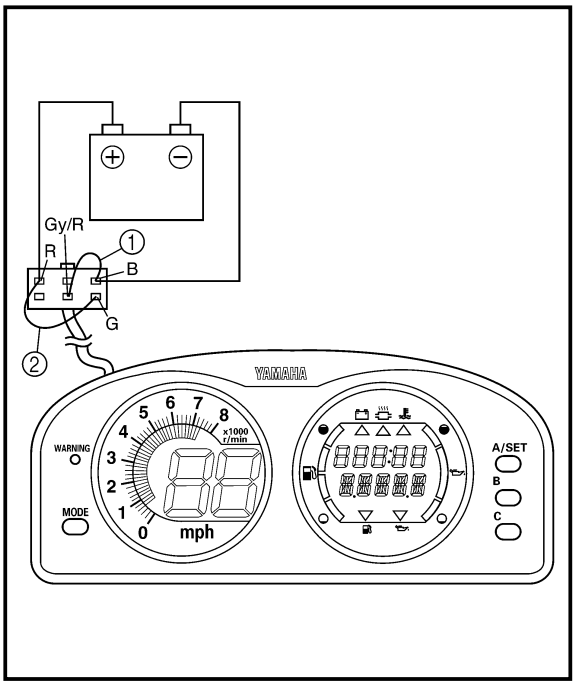


Overheat warning indicator

1. Check:
   - Overheat 1 warning indicator
     Not operating → Replace the multi-function meter.

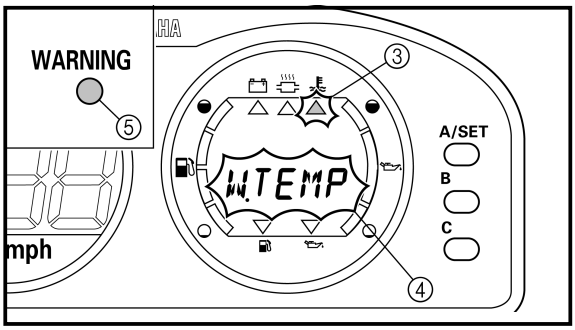
Checking steps:
- Supply DC 12 voltage to the white six-pin connector (+: red, –: black) with a battery.
- Connect the gray/black and black terminals with a jumper lead ①.
- Connect the green and red terminals with a jumper lead ②.
- Make sure the water temperature warning indicator blinks ③ and the "W.TEMP" message ④ blinks, the "WARNING" lamp ⑤ blinks, and the buzzer sounds intermittently.



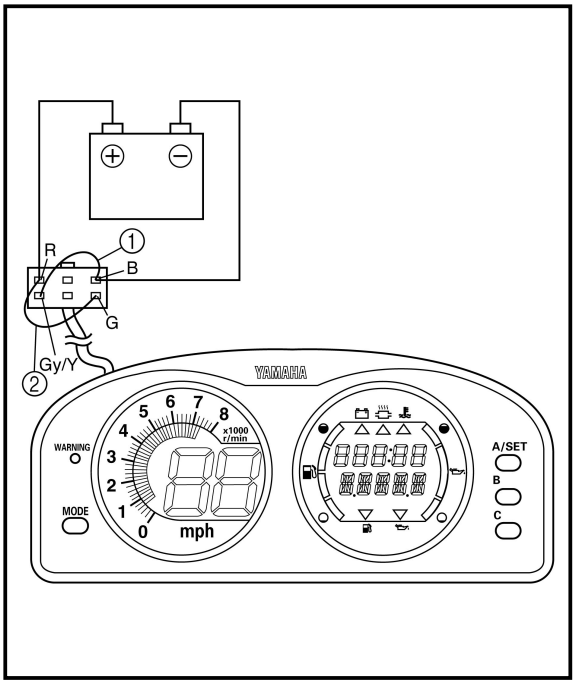


2. Check:
   - Overheat 2 warning indicator
     Not operating → Replace the multi-function meter.

Checking steps:
- Supply DC 12 voltage to the white six-pin connector (+: red, –: black) with a battery.
- Connect the gray/red and black terminals with a jumper lead ①.
- Connect the green and red terminals with a jumper lead ②.

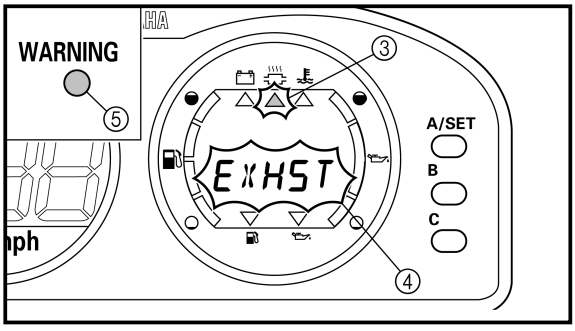


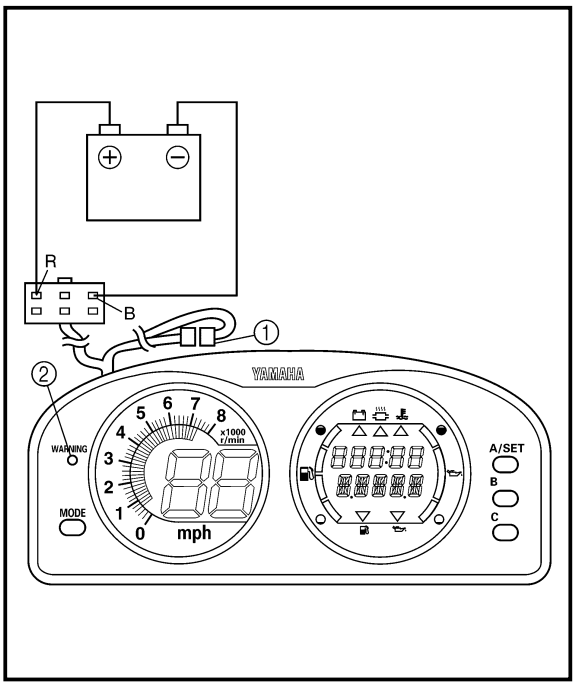
● Make sure the water temperature warning indicator display ③ and the "W.TEMP" message ④ display, the "WARNING" lamp ⑤ operates properly, and the buzzer sounds continuity.

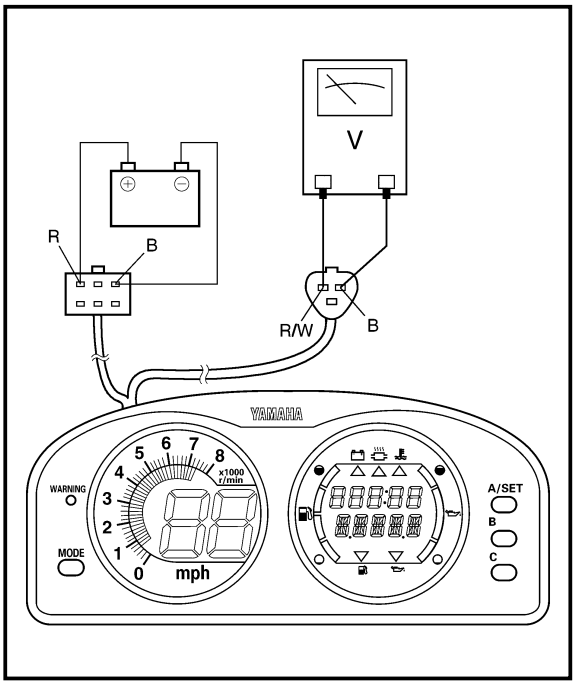


3. Check:
   ● Exhaust temperature warning indicator
   Not operating → Replace the multi-function meter.

Checking steps:
● Supply DC 12 voltage to the white six-pin connector (+: red, –: black) with a battery.
● Connect the gray/yellow and black terminals with a jumper lead ①.
● Connect the green and red terminals with a jumper lead ②.
● Make sure the exhaust temperature warning indicator blinks ③ and the "EXHST" message ④ blinks, the "WARNING" lamp ⑤ operates properly, and the buzzer sounds intermittently.







Speed meter

1. Check:
   - Speed meter output voltage
     Within specification → Check the speed sensor output voltage and pulses.
     Out of specification → Replace.

Speed meter output voltage:
10.5 V

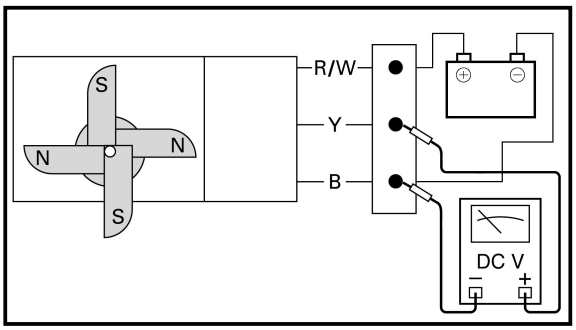
Checking steps:

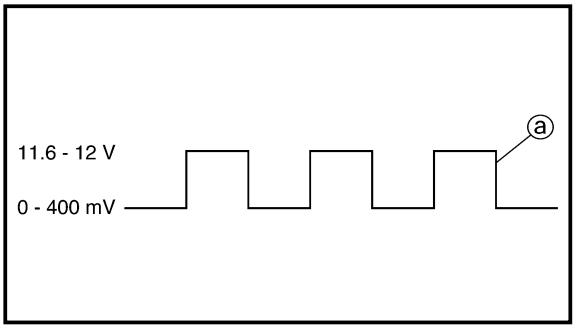
- Supply DC 12 voltage to the white six-pin connector (+: red, –: black) with a battery.
- Disconnect the blue one-pin connector ① and make sure the "WARNING" lamp lights ②.

NOTE:

If the "WARNING" lamp does not light, disconnect the battery and then reconnect it.

- Measure the voltage on the speed meter connector (white three-pin connector) (between the red/white and black leads).





Speed sensor

1. Check:
   - Speed sensor output voltage and pulses
     Out of specification → Replace.

Speed sensor output voltage (dependant on the paddle wheel position):
Less than 400 mV/11.6 - 12 V
Output pulse:
2 pulses/one-full turn

Checking steps:

- Apply DC 12 voltage to the white three-pin connector (between the red/white and black leads).
- Rotate the paddle wheel by hand and measure the voltage between the black and yellow leads.

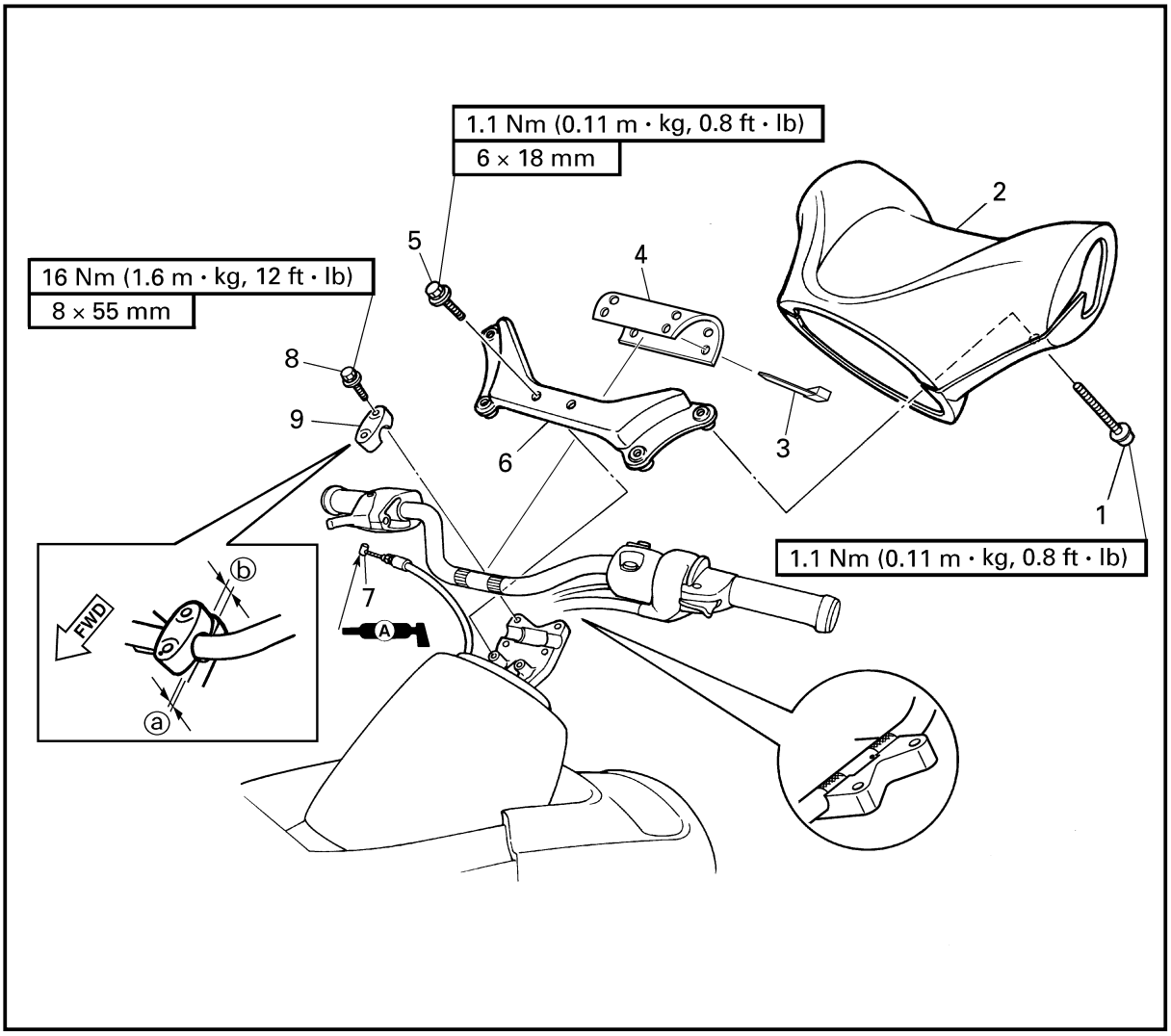
NOTE:

As the paddle wheel is rotated, a square-wave voltage signal ⓐ is produced.

- Two pulses occur every time the paddle wheel makes one-full turn.

CHAPTER 8
HULL AND HOOD

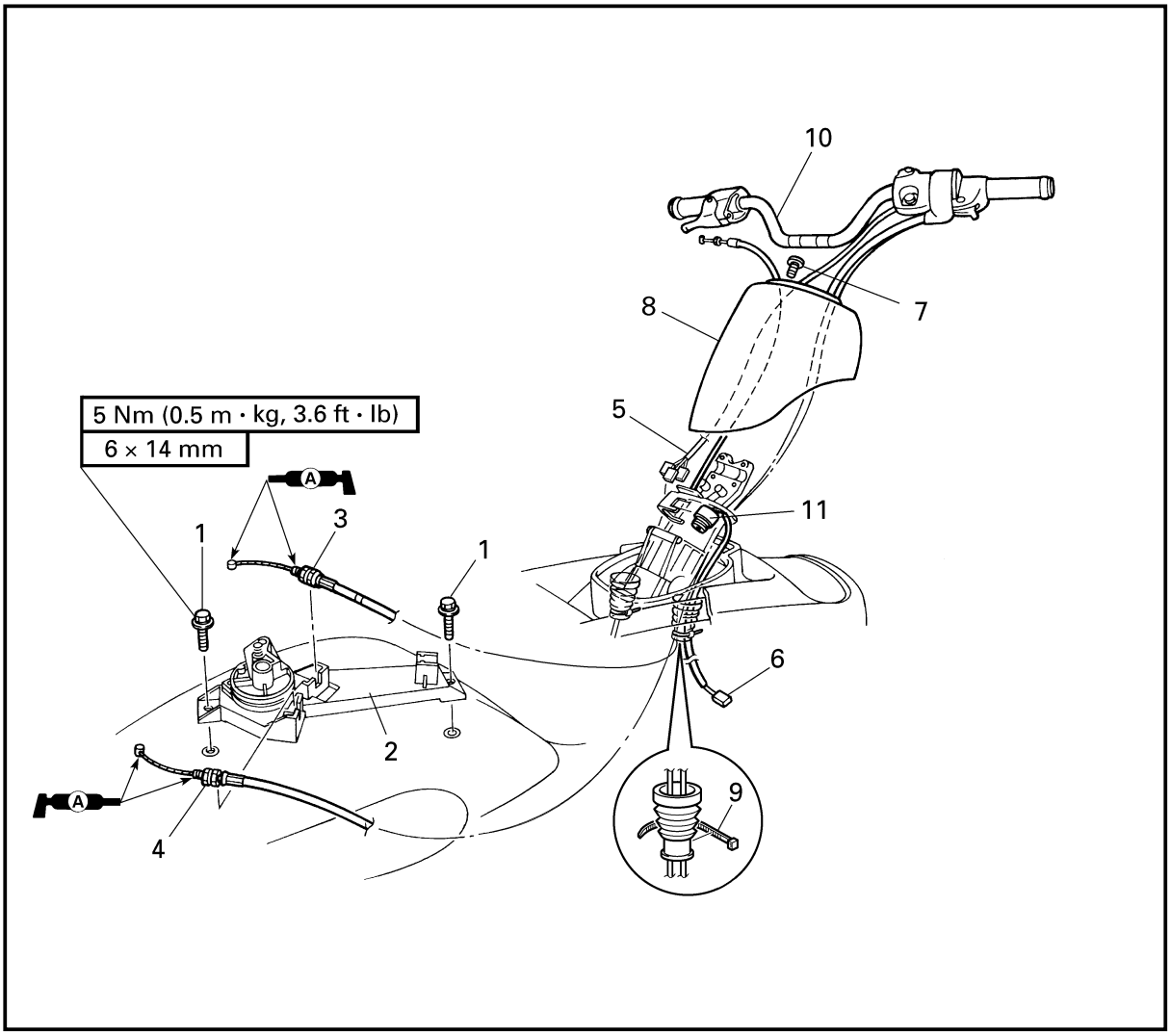
HANDLEBAR
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	HANDLEBAR COVER REMOVAL		Follow the left "Step" for removal.
1	Screw	4	
2	Handlebar cover	1	
3	Band	2	
4	Pad	1	
5	Bolt	2	
6	Handlebar cover stay	1	
7	Throttle cable	1	
8	Bolt	4	
9	Upper handlebar holder	2	
			Reverse the removal steps for installation.

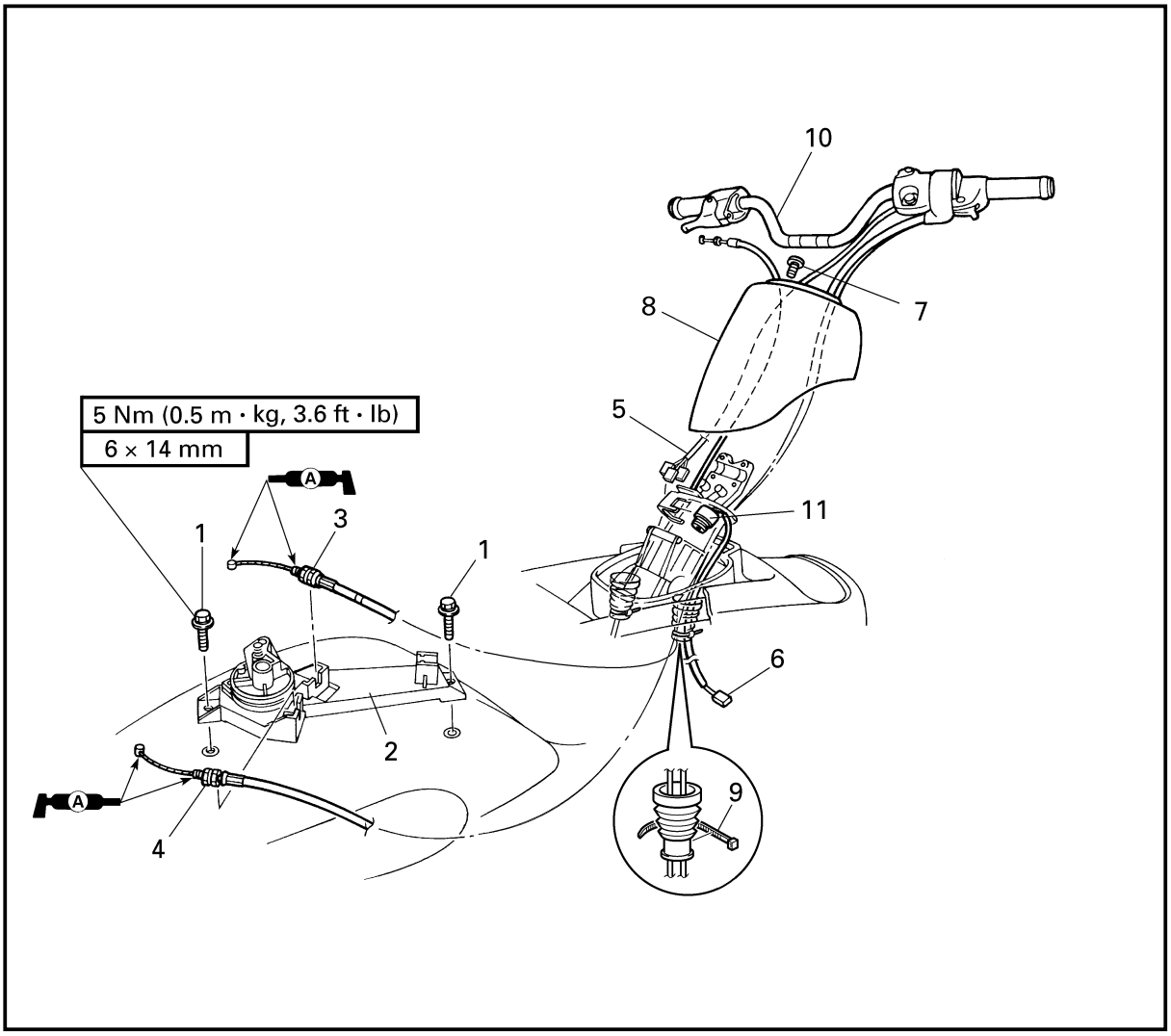
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

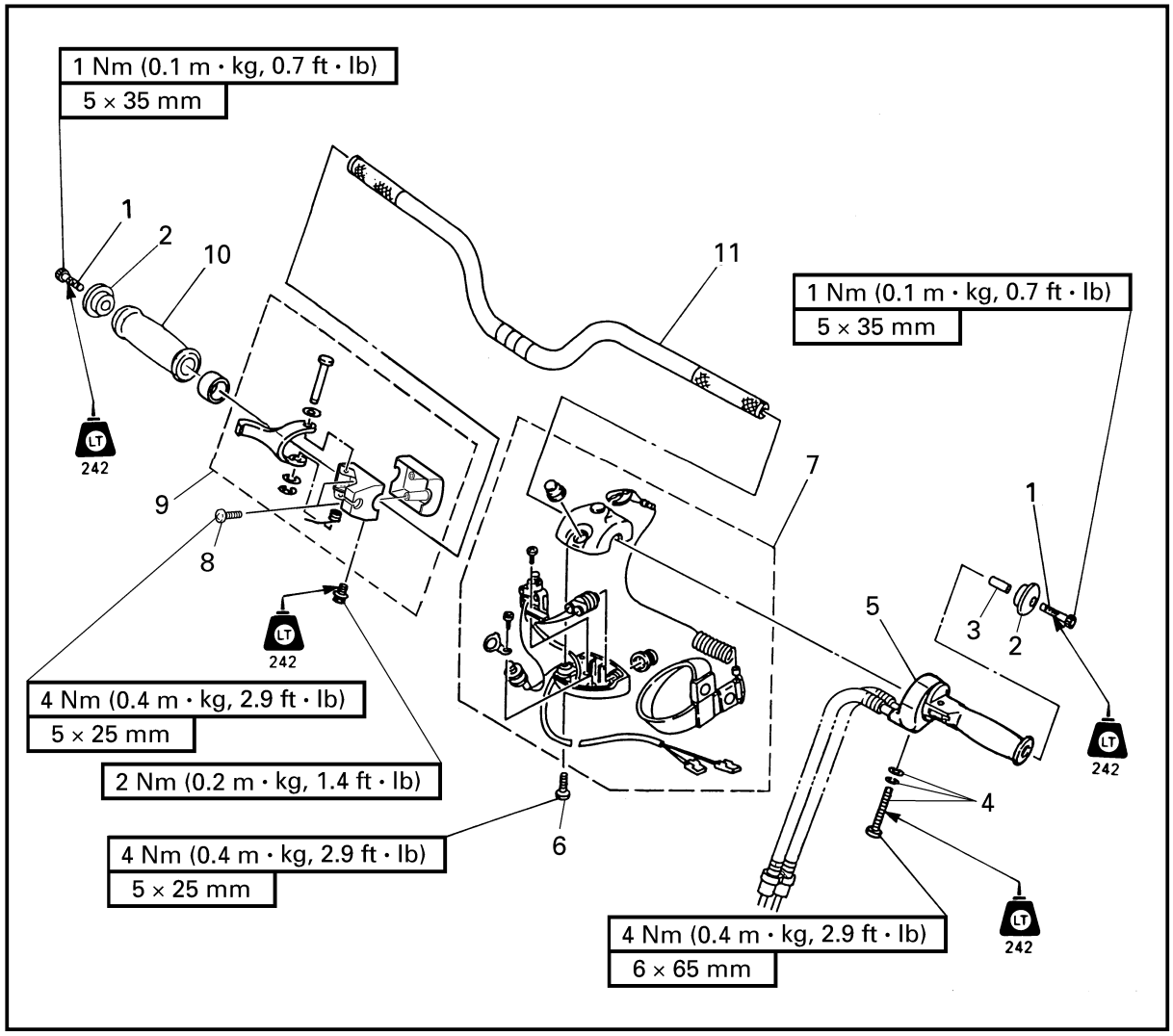
Step	Procedure/Part name	Q'ty	Service points
	HANDLEBAR REMOVAL		Follow the left "Step" for removal.
	QSTS cable (to jet nozzle)		Refer to "REMOTE CONTROL CABLES AND SPEED SENSOR LEAD".
1	Bolt	2	
2	QSTS converter	1	
3	QSTS cable 2	1	with white tape
4	QSTS cable 1	1	
5	Handlebar switch coupler	3	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
6	Buzzer coupler	1	
7	Screw	4	
8	Handle boss cover	1	
9	Band	2	
10	Handlebar assembly	1	
11	Buzzer	1	
			Reverse the removal steps for installation.

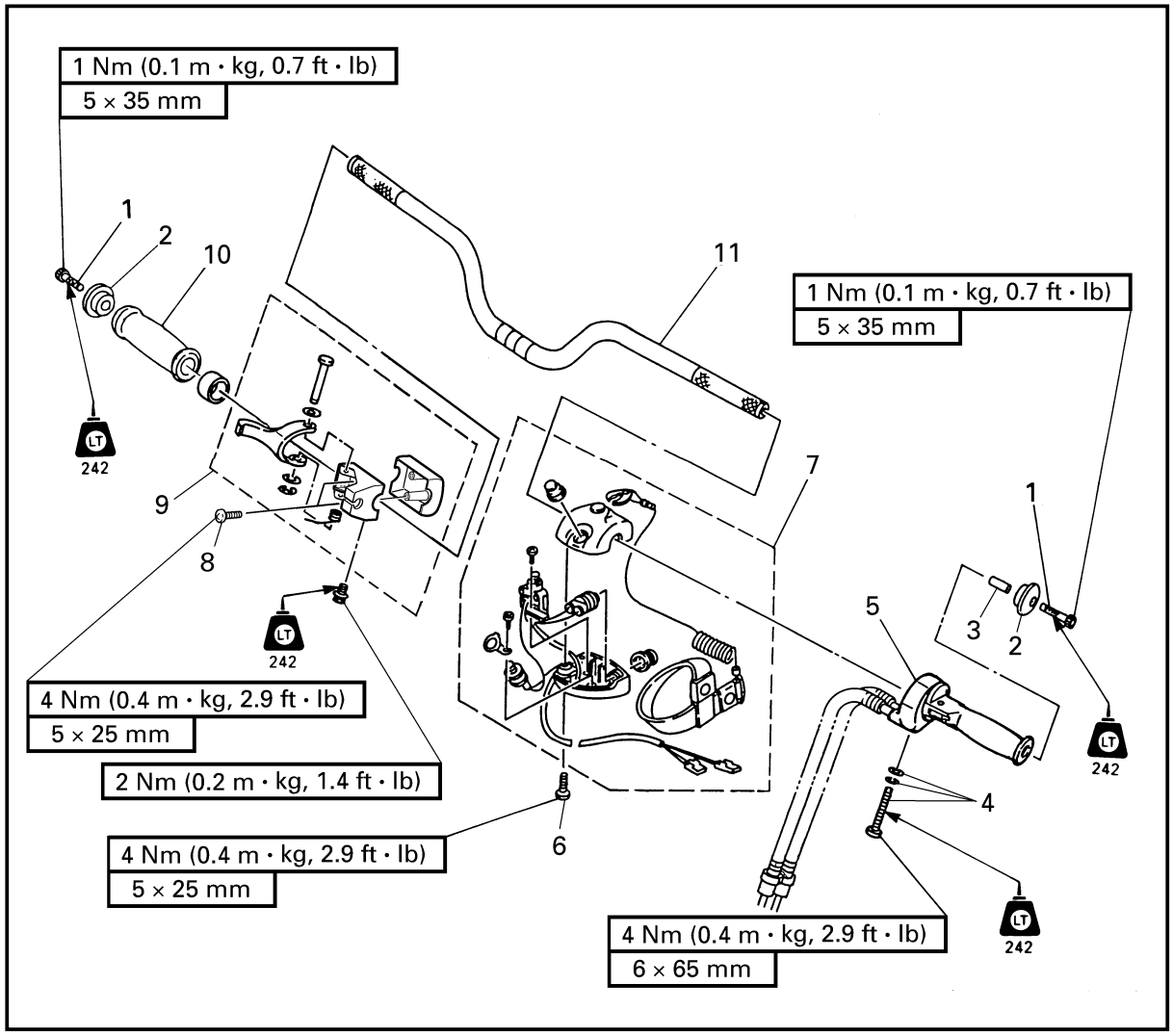
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	HANDLEBAR DISASSEMBLY		Follow the left "Step" for disassembly.
1	Bolt	2	
2	Grip end	2	
3	Spacer	1	
4	Screw/washer/spring washer	1/1/1	
5	QSTS grip assembly	1	
6	Screw	2	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Handlebar switch assembly	1	
8	Screw	2	
9	Throttle lever assembly	1	
10	Handlebar grip	1	**NOTE:** Apply adhesive to the handlebar and the inner surface of the handlebar grip.
11	Handlebar	1	Reverse the disassembly steps for assembly.

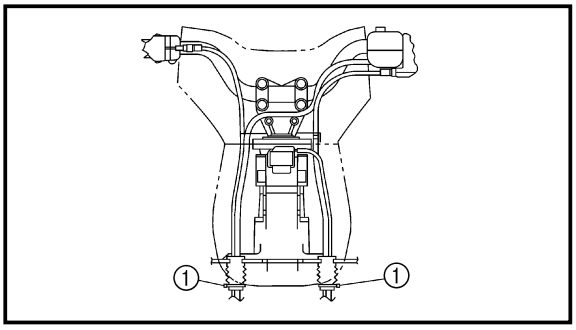
SERVICE POINTS

Handlebar inspection

1. Inspect:
   - Handlebar
     Bends/cracks/damage → Replace.

Handlebar switch inspection

Refer to "STARTING SYSTEM" in chapter 7.

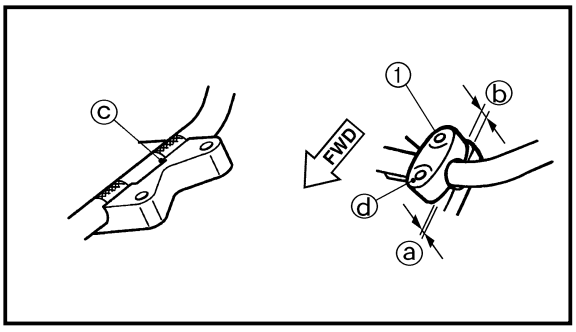


Handlebar assembly installation

1. Install:
   - QSTS cables
   - Buzzer lead
   - Handlebar switch lead
   - Throttle cable

NOTE:

After inserting the cables and leads into the grommets, tie the end of grommets with the bands ①.



2. Install:
   - Upper handlebar holder ①

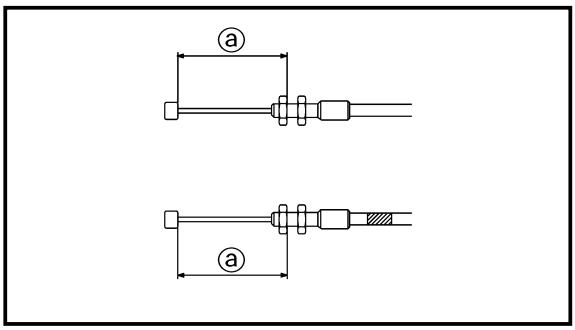
CAUTION:

Clearance ⓐ should be narrower than clearance ⓑ.

Reference clearance:
ⓐ: 1.5 mm (0.06 in)
ⓑ: 3.5 mm (0.14 in)

NOTE:

- Align the punch mark ⓒ on the handlebar with the top surface of the handlebar holder.
- The upper handlebar holder should be installed with the punch mark ⓓ facing forward.



3. Adjust:
   - QSTS cable length ⓐ

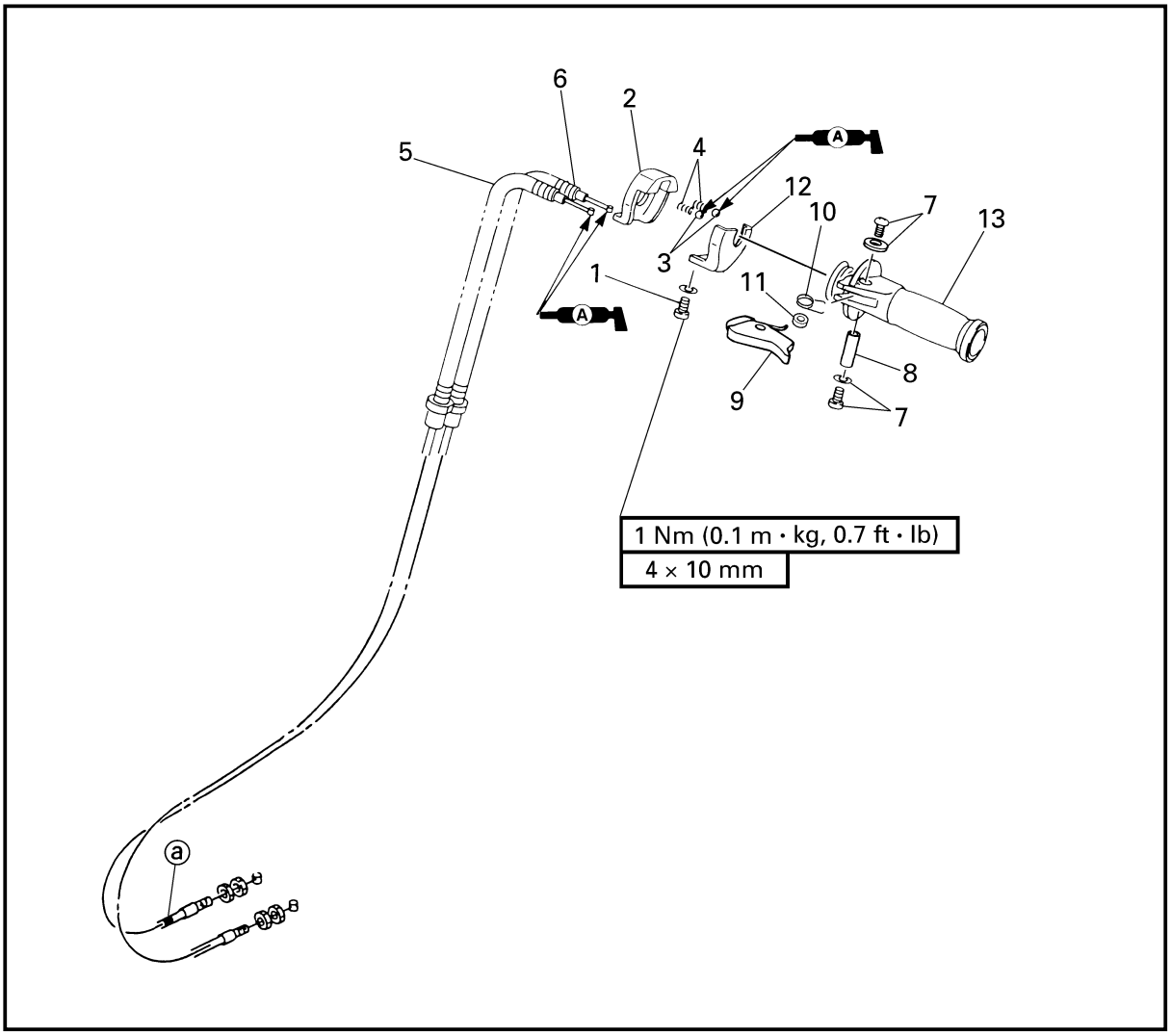
QSTS cable length:
77 ± 0.5 mm (3.03 ± 0.02 in)

NOTE:
- Before adjusting the QSTS cables, set the trim grip to the neutral position.
- Adjust the QSTS cable lengths ⓐ to the specified length and be sure to take up any slack.

4. Adjust:
   - Throttle cable free play
     Refer to "CONTROL SYSTEM" in chapter 3.
5. Adjust:
   - QSTS cable free play
     Refer to "CONTROL SYSTEM" in chapter 3.

QSTS GRIP

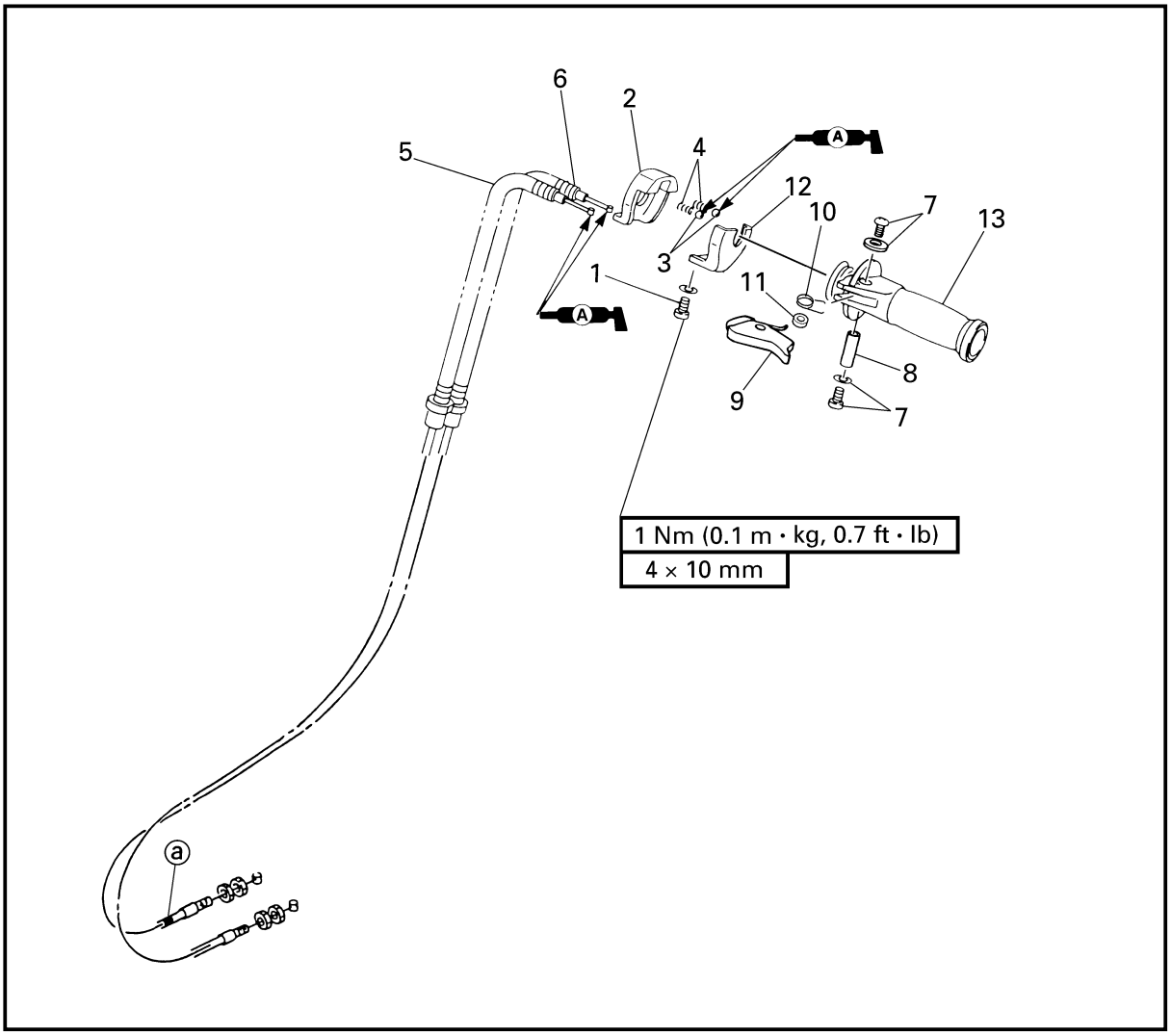
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	QSTS GRIP DISASSEMBLY		Follow the left "Step" for disassembly.
	QSTS grip assembly		Refer to "HANDLEBAR".
1	Screw/washer	1/1	
2	Cover	1	
3	Ball	2	
4	Spring	2	
5	QSTS cable 1	1	
6	QSTS cable 2	1	**NOTE:** QSTS cable 2 has white tape ⓐ on its end.

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Screw/washer	2/2	
8	Spacer	1	
9	QSTS grip position locator	1	
10	Spring	1	
11	Spacer	1	
12	Cable housing	1	
13	QSTS grip	1	
			Reverse the disassembly steps for assembly.

SERVICE POINTS

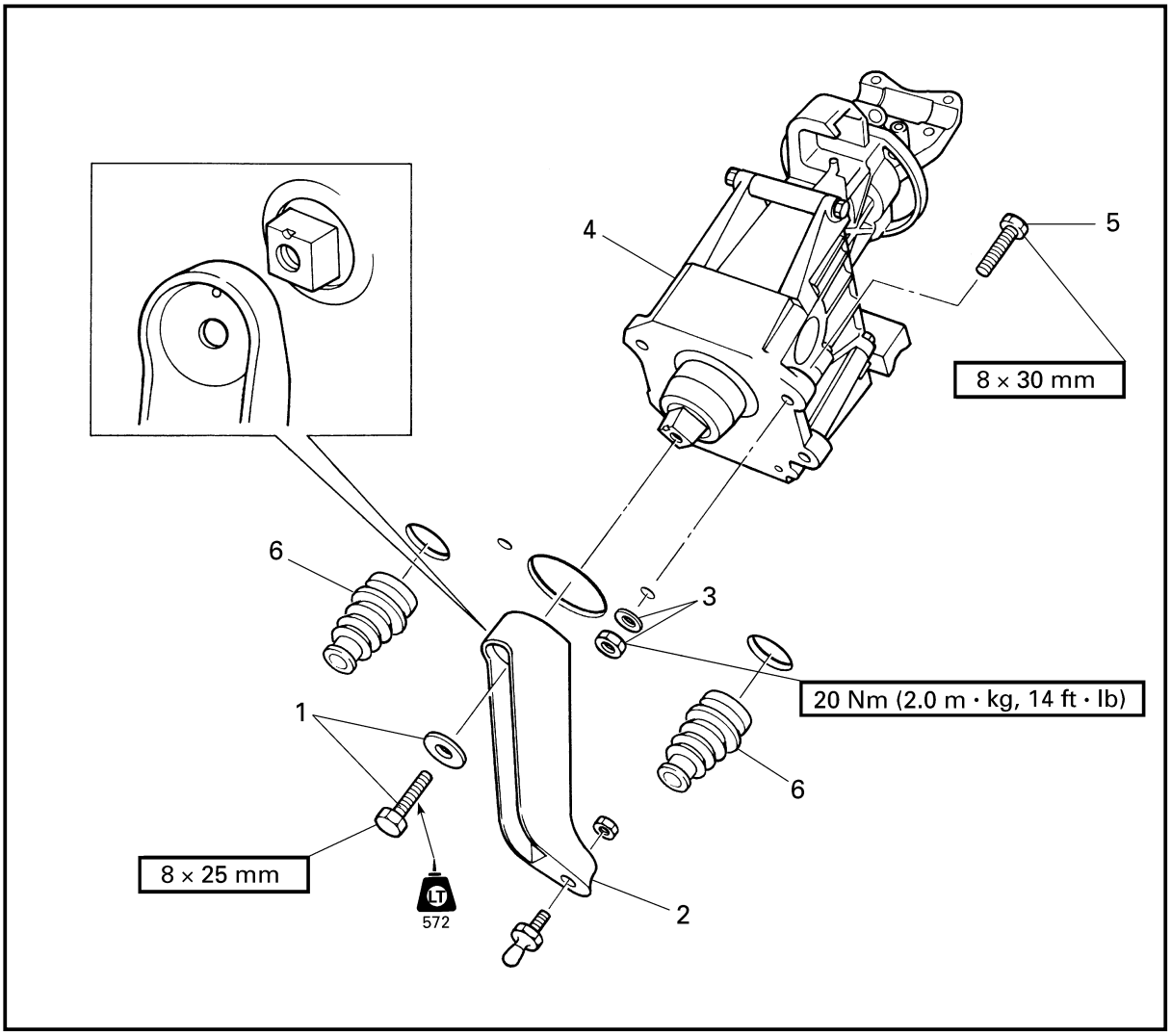
QSTS cable inspection

1. Inspect:
   - QSTS cables
     Frays/kinks/rough movement → Replace.

QSTS grip inspection

1. Inspect:
   - QSTS grip
     Damage/wear → Replace.

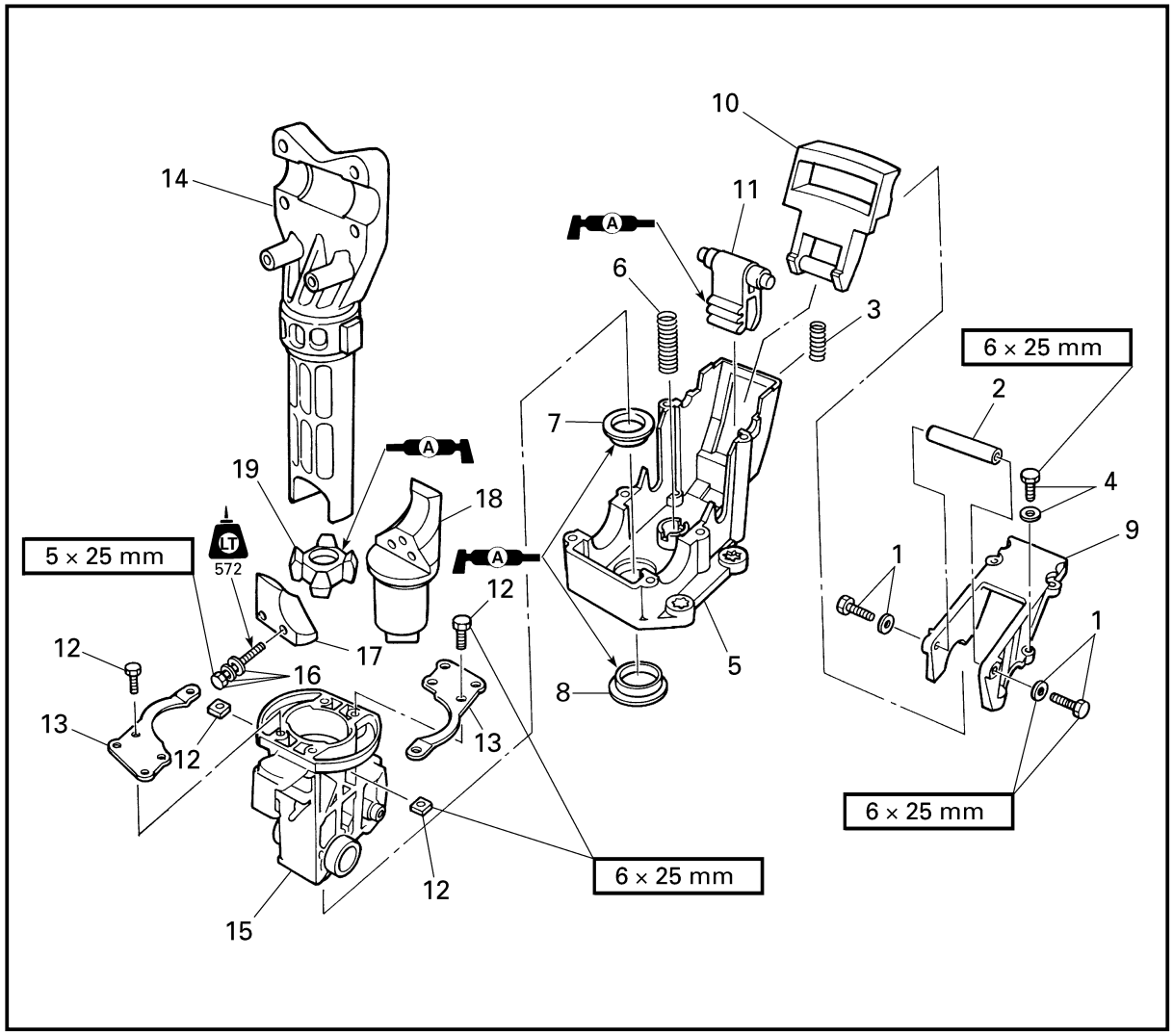
STEERING MASTER
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	STEERING MASTER REMOVAL		Follow the left "Step" for removal.
	Handlebar assembly		Refer to "HANDLEBAR".
	Steering master cover		Refer to "STEERING MASTER COVER".
1	Bolt/washer	1/1	
2	Steering arm	1	
3	Nut/washer	4/4	
4	Steering master assembly	1	
5	Bolt	4	
6	Grommet	2	
			Reverse the removal steps for installation.

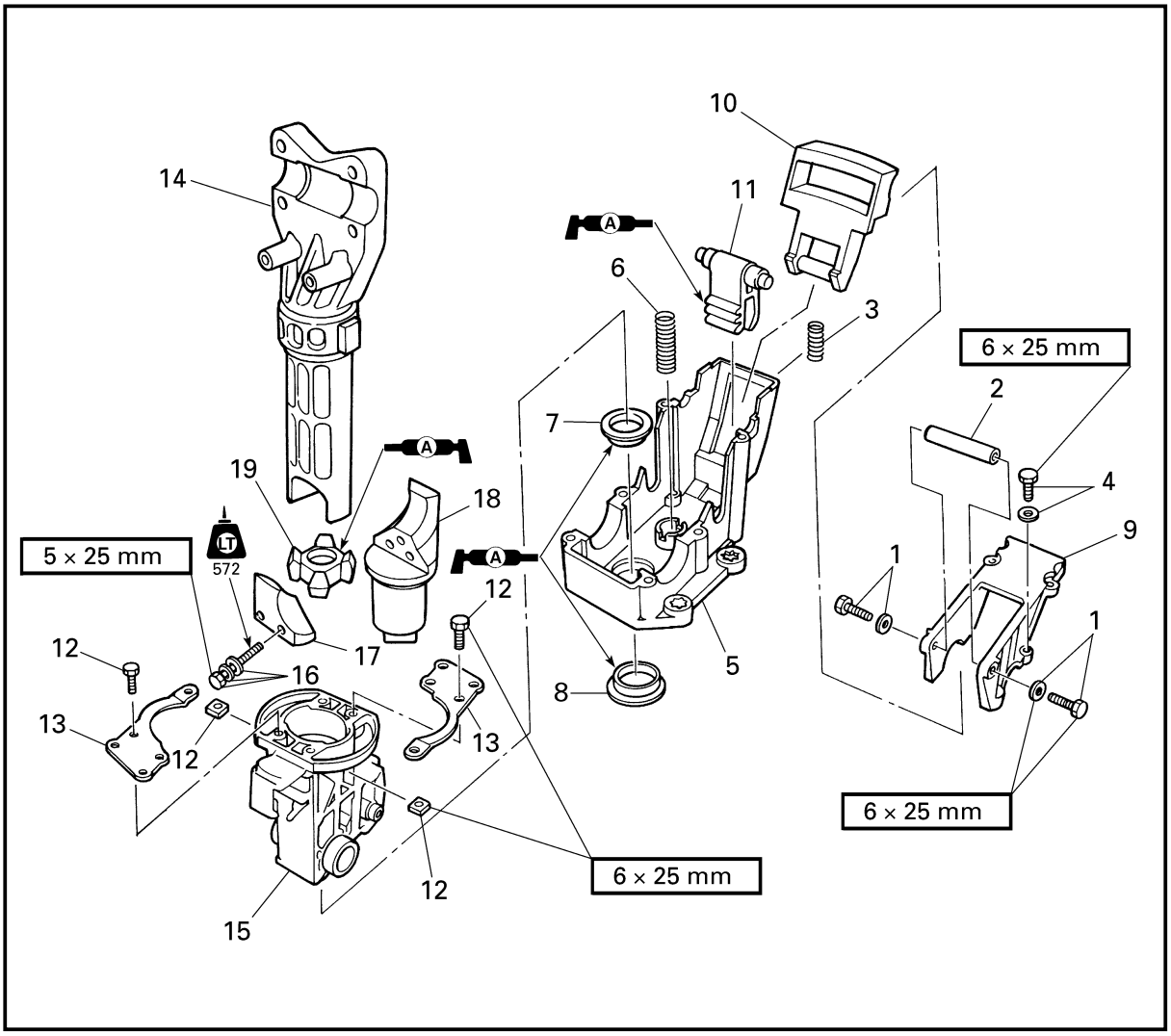
EXPLODED DIAGRAM



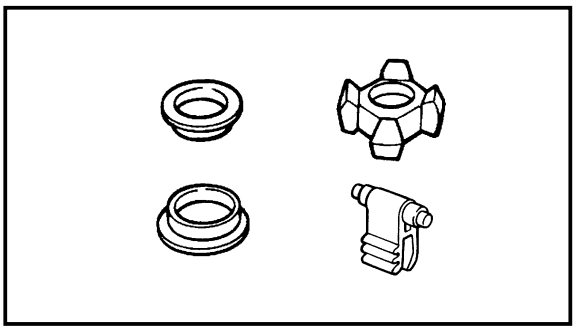
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	STEERING MASTER DISASSEMBLY		Follow the left "Step" for disassembly.
1	Bolt/washer	2/2	
2	Stay	1	
3	Spring	1	
4	Bolt/washer	6/6	
5	Lower housing	1	
6	Spring	1	
7	Bushing	1	
8	Bushing	1	
9	Upper housing	1	
10	Tilt lever	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
11	Tilt stopper	1	
12	Bolt/nut	4/4	
13	Retainer	2	
14	Steering shaft assembly	1	
15	Steering tube	1	
16	Bolt/washer/spring washer	2/2/2	
17	Cap	1	
18	Shaft 1	1	
19	Cross piece	1	
			Reverse the disassembly steps for assembly.



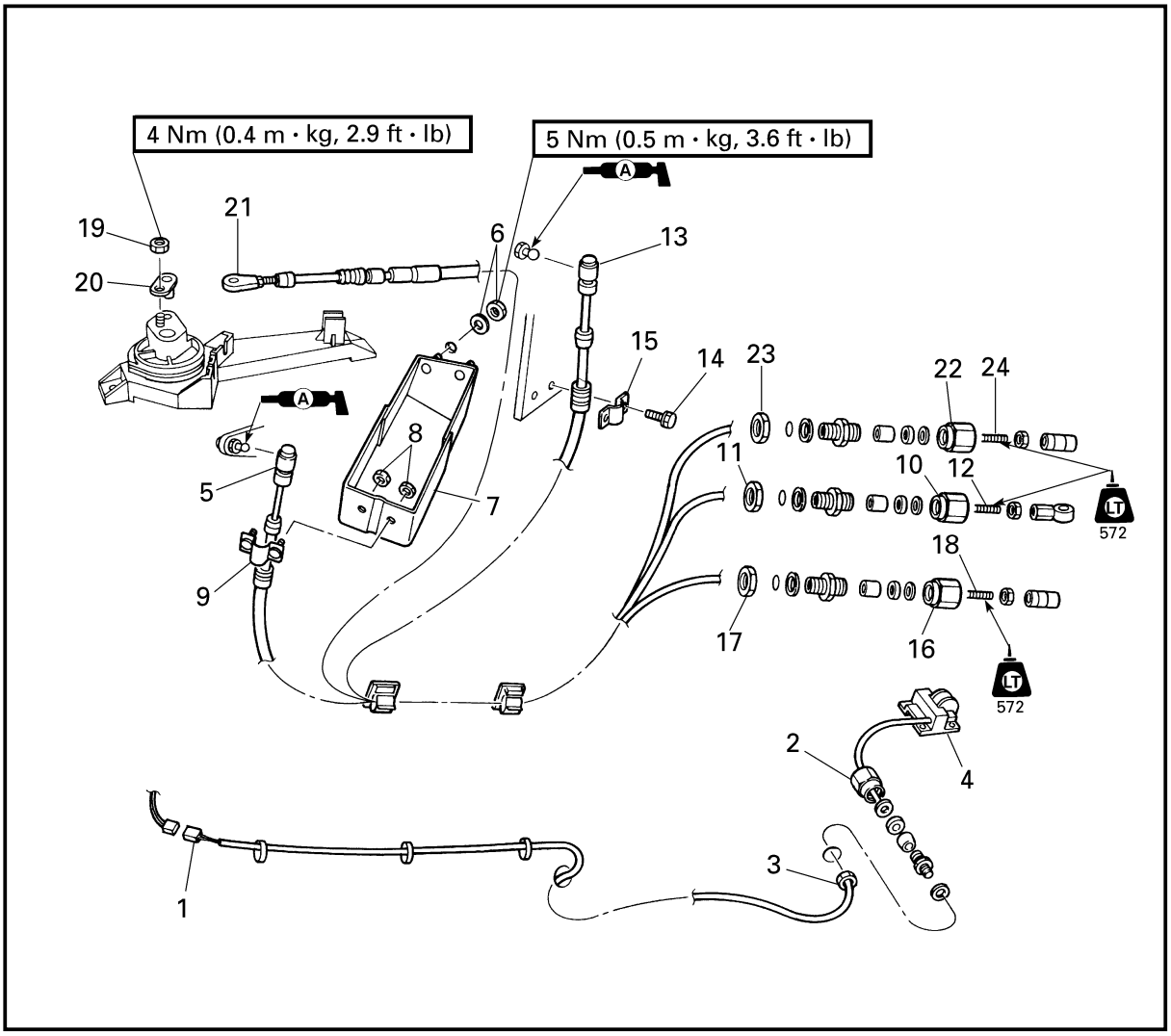
SERVICE POINTS

Steering master components inspection

1. Inspect:
   - Each component part
     Damage/wear → Replace the steering master.

REMOTE CONTROL CABLES AND SPEED SENSOR LEAD

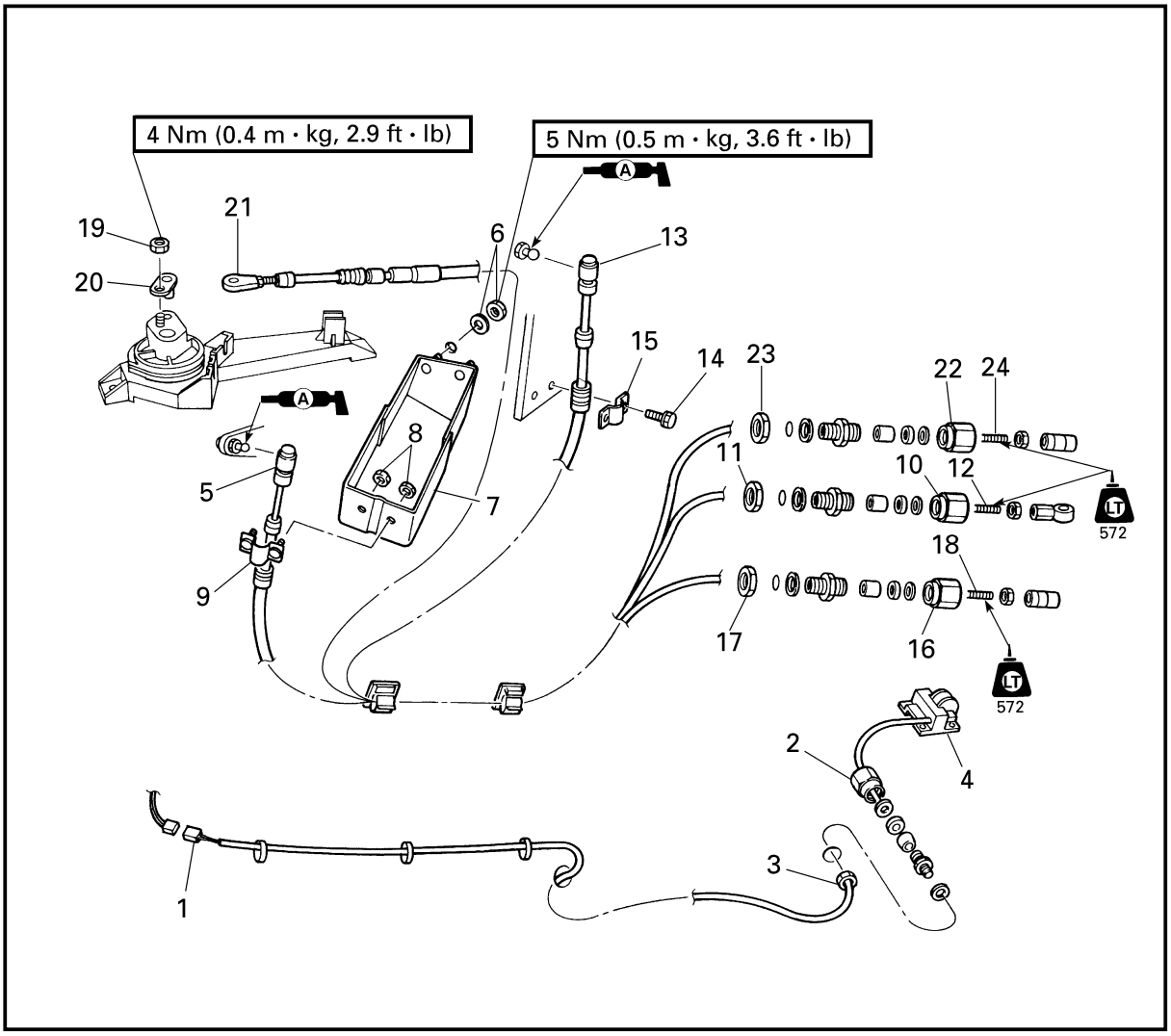
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

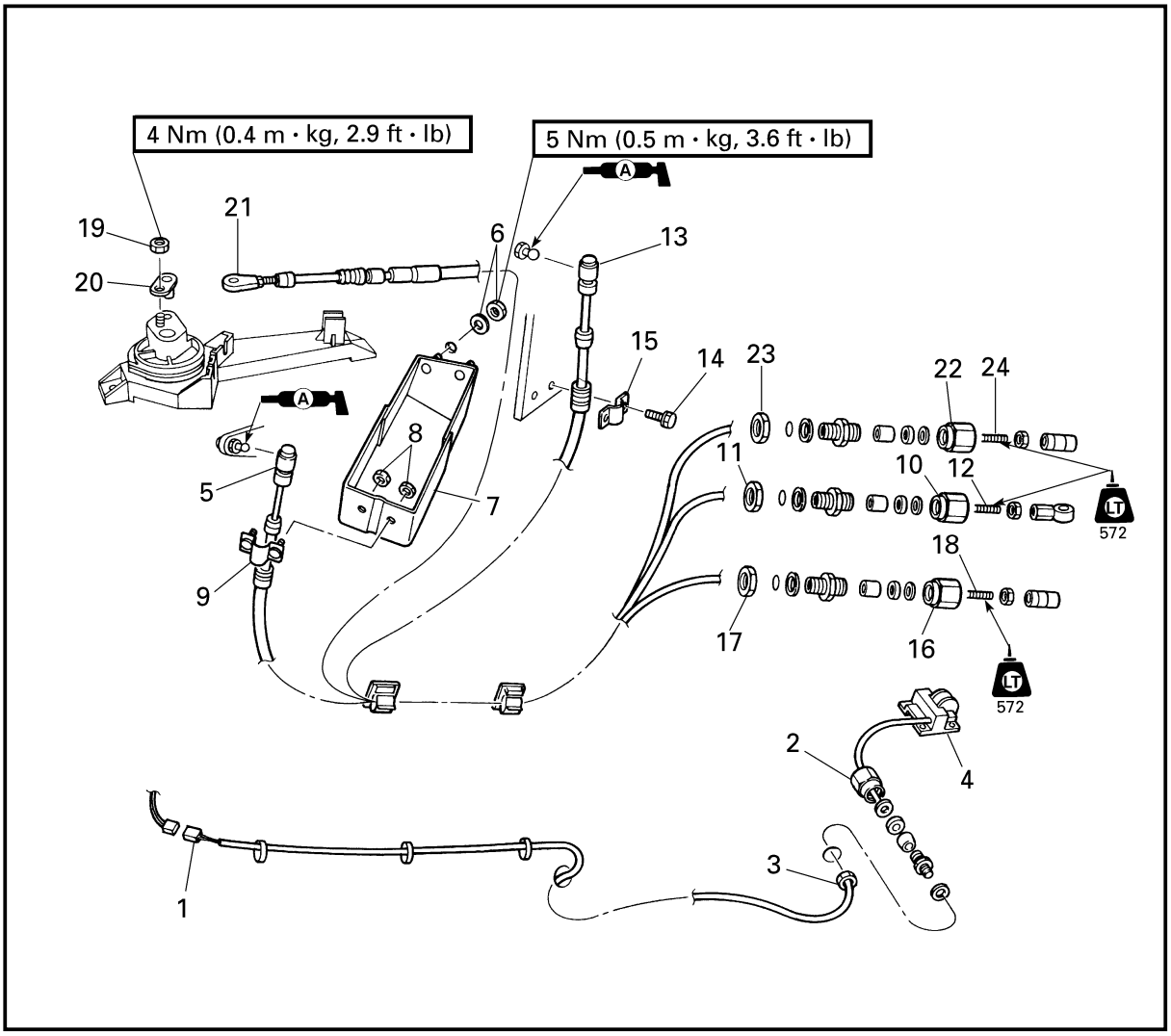
Step	Procedure/Part name	Q'ty	Service points
	REMOTE CONTROL CABLES AND SPEED SENSOR LEAD REMOVAL		Follow the left "Step" for removal.
1	Speed sensor coupler	1	
2	Cap	1	
3	Nut	1	
4	Speed sensor	1	
5	Steering cable end	1	
6	Nut/washer	3/3	
7	Bracket	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
8	Nut	2	
9	Steering cable holder	1	
10	Cap	1	
11	Nut	1	
12	Steering cable	1	
13	Shift cable end	1	
14	Bolt	2	
15	Shift cable holder	1	
16	Cap	1	

EXPLODED DIAGRAM



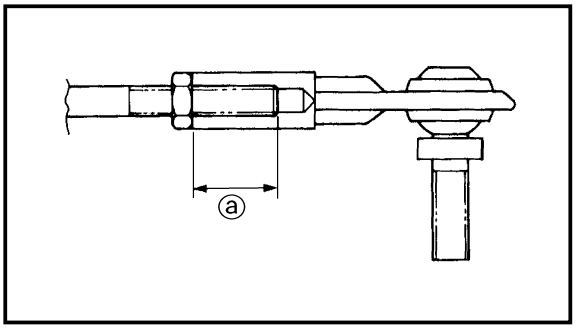
Step	Procedure/Part name	Q'ty	Service points
17	Nut	1	
18	Shift cable	1	
19	Nut	1	
20	Pin	1	
21	QSTS cable end	1	
22	Cap	1	
23	Nut	1	
24	QSTS cable	1	
			Reverse the removal steps for installation.

SERVICE POINTS

Remote control cables inspection

1. Inspect:
   - Steering cable
   - QSTS cable
   - Shift cable

   Frays/kinks/rough movement → Replace.



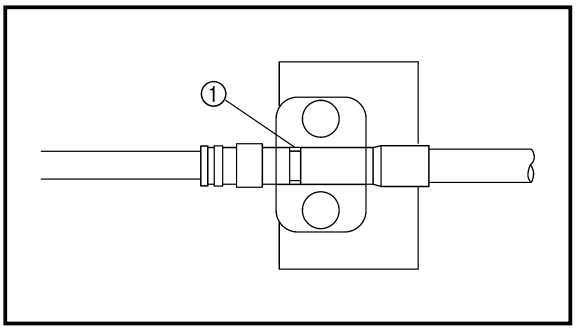
Steering cable (jet pump side) installation

1. Install:
   - Steering cable ⓐ

Steering cable set length (jet pump side):
13.5 ~ 15.5 mm (0.53 ~ 0.61 in)

⚠ WARNING

The steering cable must be screwed in at least 8 mm (0.31 in).

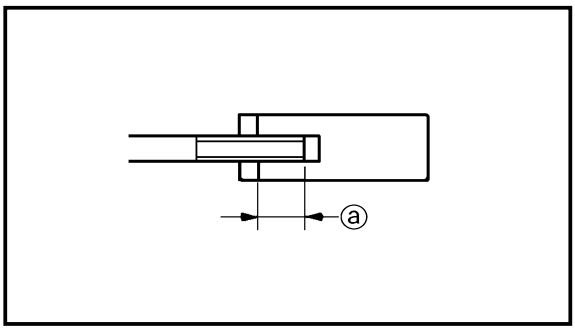


Steering cable stopper installation

1. Install:
   - Steering cable stopper

⚠ WARNING

Be sure to fit the projection ① on the steering cable stopper into the groove in the outer cable.



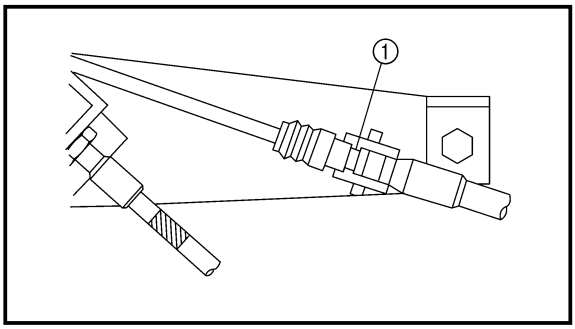
QSTS cable (jet pump side) installation

1. Install:
   - QSTS cable (jet pump side) ⓐ

QSTS cable set length (jet pump side):
12.0 ~ 14.0 mm (0.47 ~ 0.55 in)

⚠ WARNING

The QSTS cable must be screwed in more than 8 mm (0.31 in).

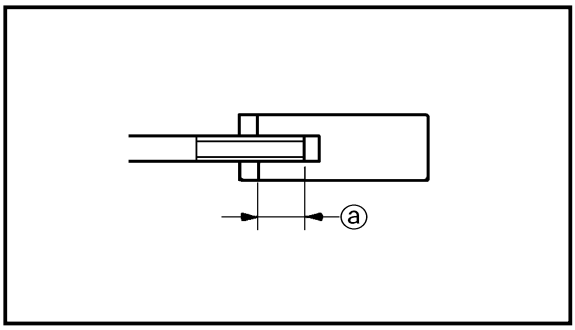


QSTS cable stopper installation

1. Install:
   - QSTS cable stopper

⚠ WARNING

Be sure to fit the projection ① on the QSTS cable stopper into the groove in the outer cable.



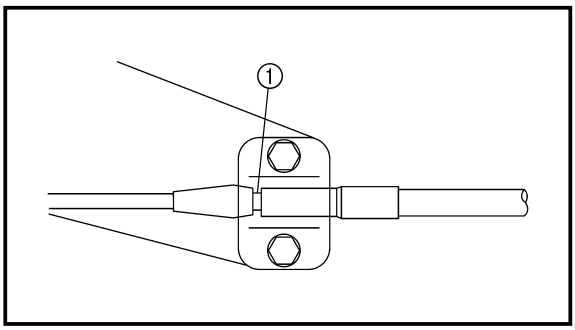
Shift cable (jet pump side) installation

1. Install:
   - Shift cable (jet pump side) ⓐ

Shift cable set length (jet pump side):
12.2 ~ 13.8 mm (0.48 ~ 0.54 in)

⚠ WARNING

The shift cable must be screwed in more than 8 mm (0.31 in).



Shift cable stopper installation

1. Install:
   - Shift cable stopper

⚠ WARNING

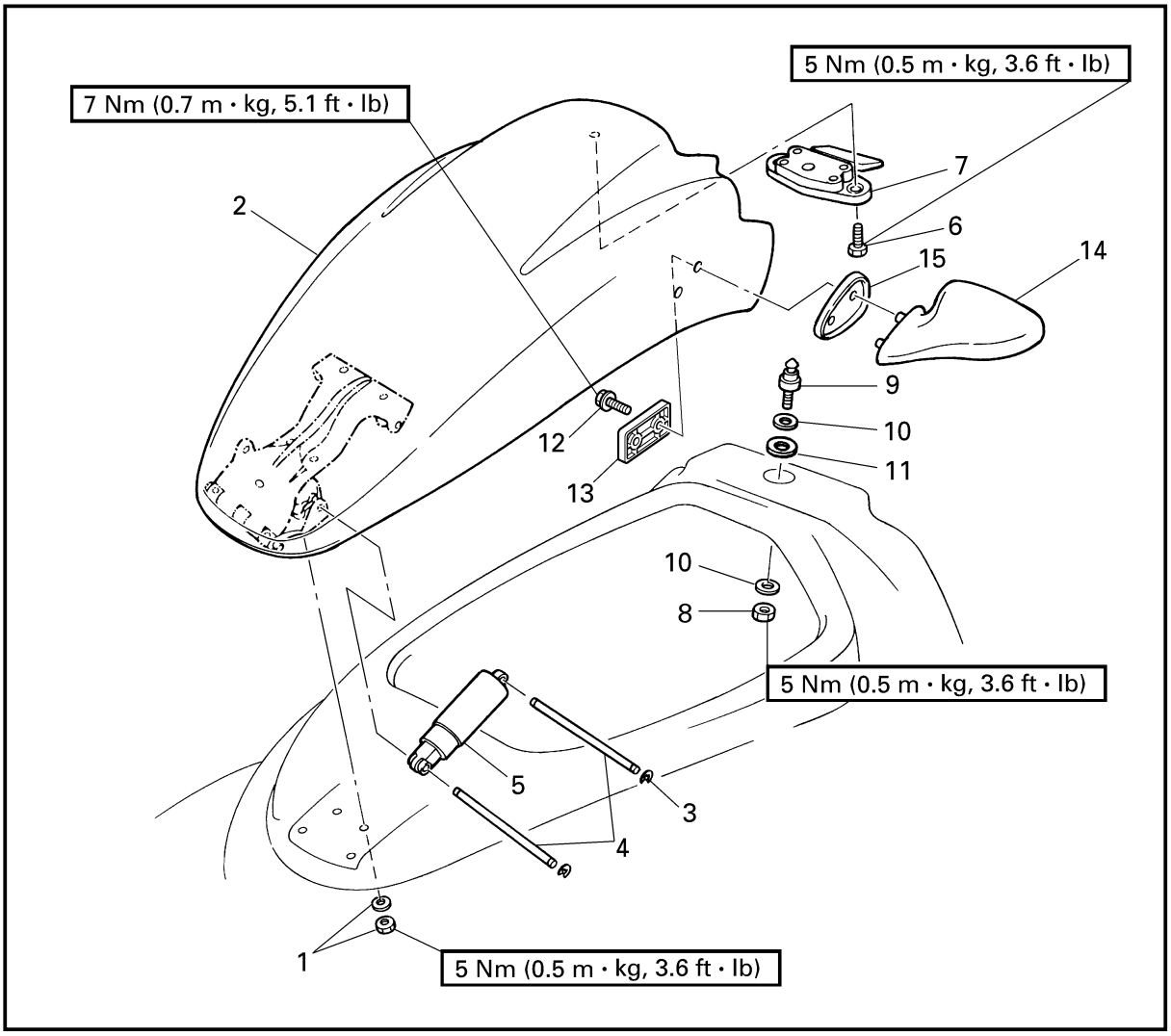
Be sure to fit the projection ① on the shift cable stopper into the groove in the outer cable.

Remote control cables adjustment

Refer to "CONTROL SYSTEM" in chapter 3.

FRONT HOOD

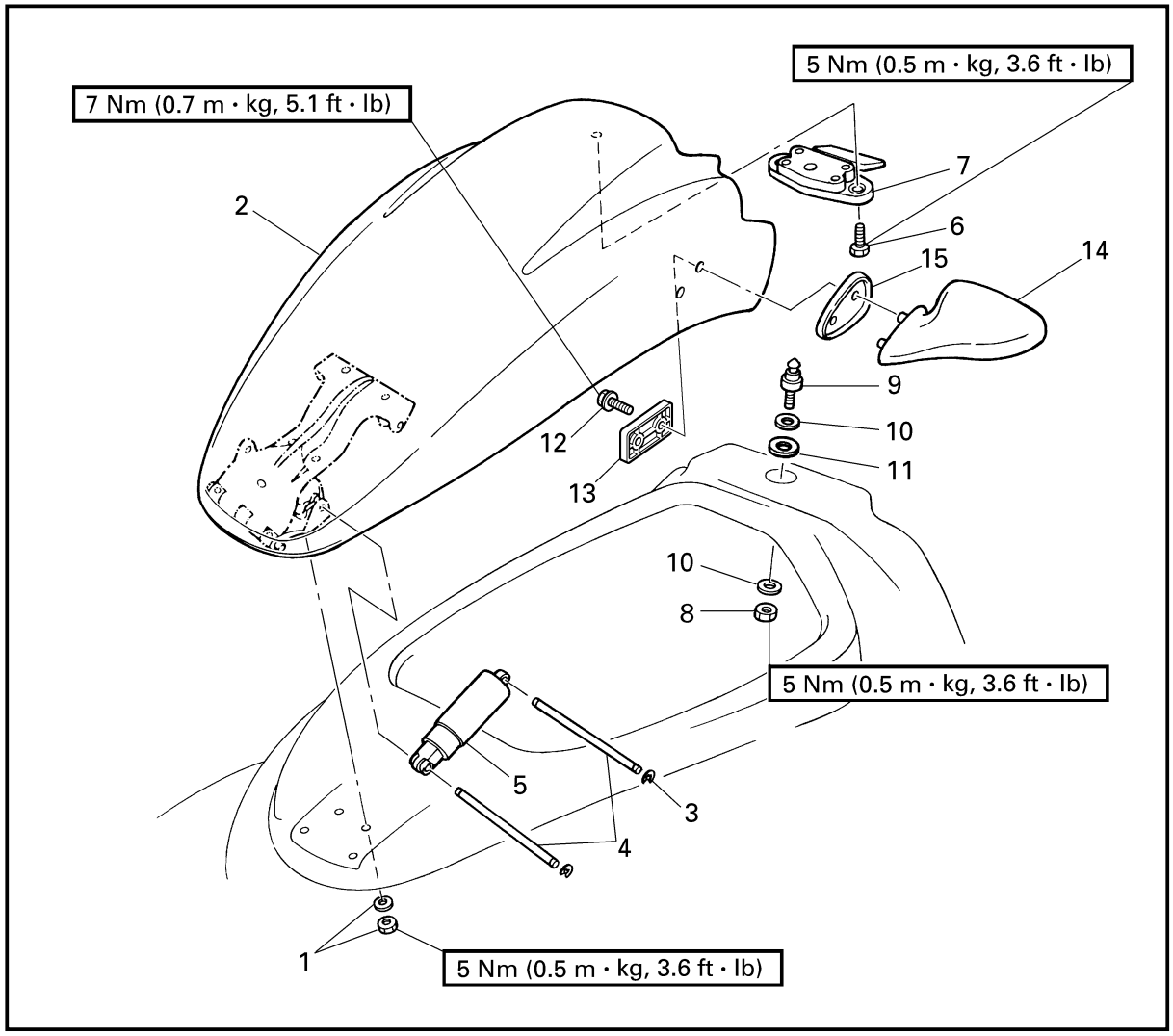
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	FRONT HOOD REMOVAL		Follow the left "Step" for removal.
1	Nut/washer	4/4	
2	Front hood assembly	1	
3	Circlip	4	
4	Pin	2	
5	Damper	2	
6	Bolt	2	
7	Hood lock assembly	1	

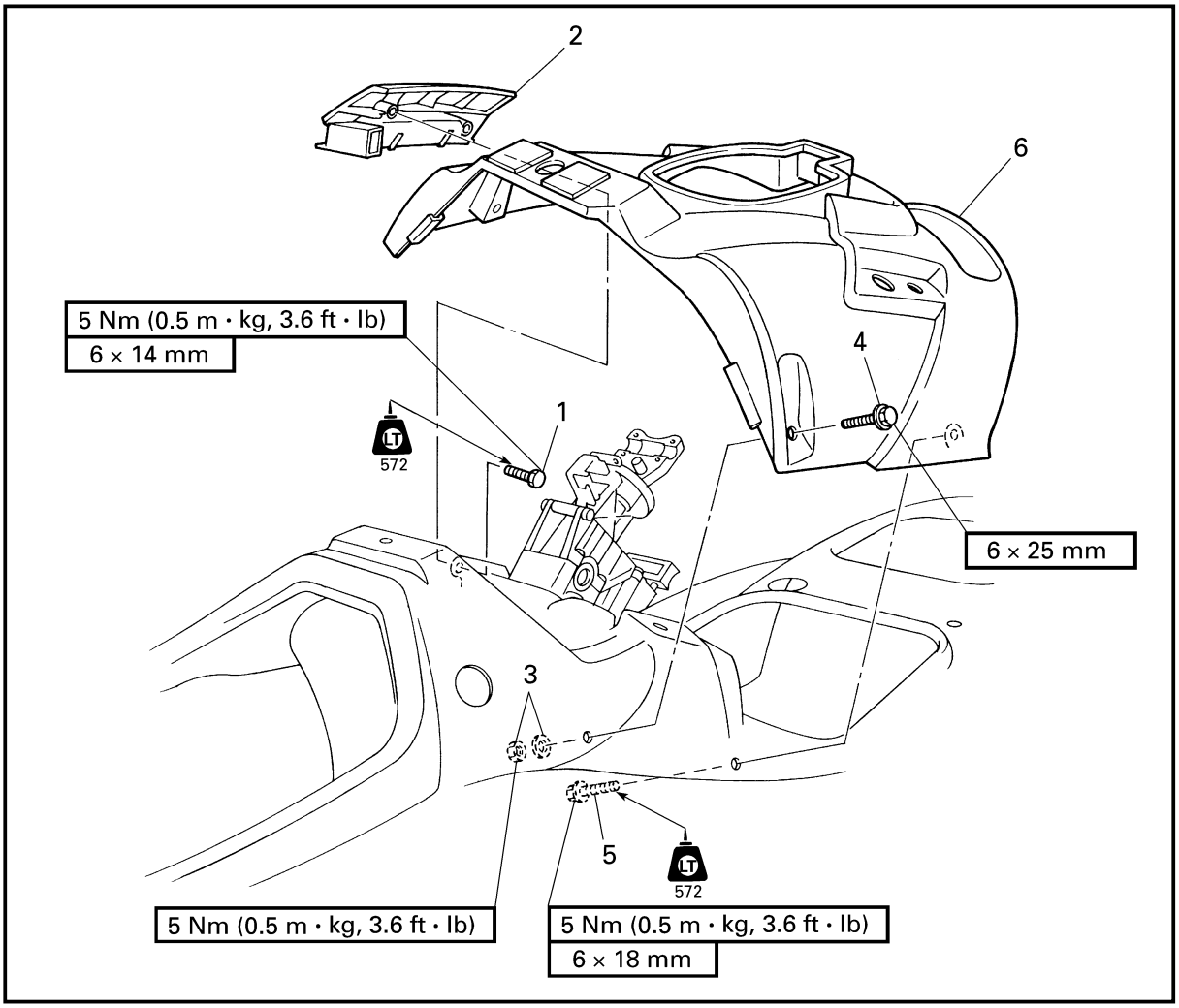
EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
8	Nut	1	
9	Notch	1	
10	Washer	2	
11	Damper	1	
12	Bolt	4	
13	Plate	2	
14	Mirror	2	
15	Packing	2	
			Reverse the removal steps for installation.

STEERING MASTER COVER

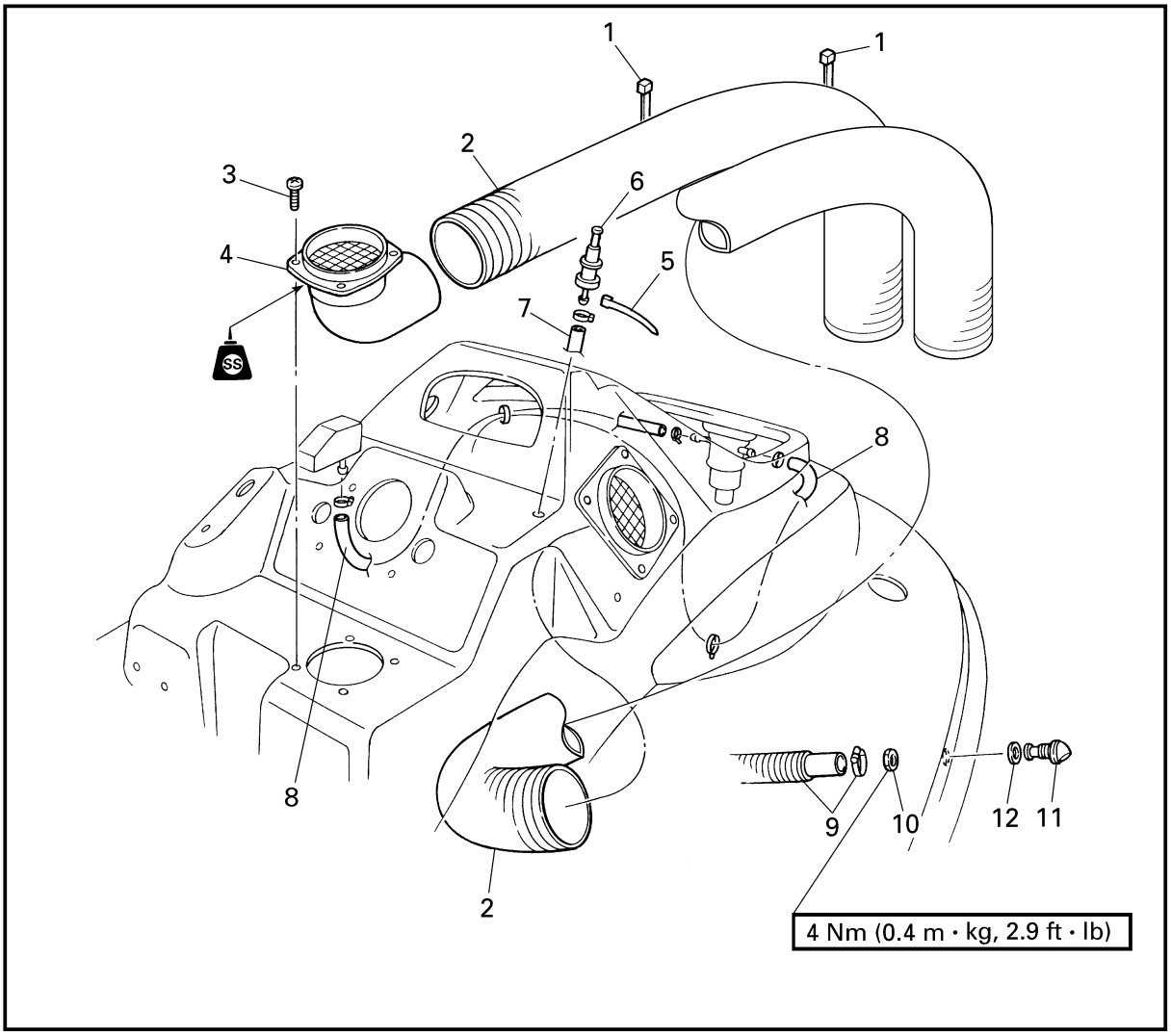
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	STEERING MASTER COVER REMOVAL		Follow the left "Step" for removal.
	Handlebar assembly		Refer to "HANDLEBAR".
	Fuel cock		Refer to "FUEL COCK AND FUEL FILTER" in chapter 4.
	Choke knob		Refer to "CHOKE CABLE" in chapter 4.
1	Bolt	2	
2	Shift lever handle	1	
3	Nut/washer	2/2	
4	Bolt	2	
5	Bolt	2	
6	Steering master cover	1	
			Reverse the removal steps for installation.

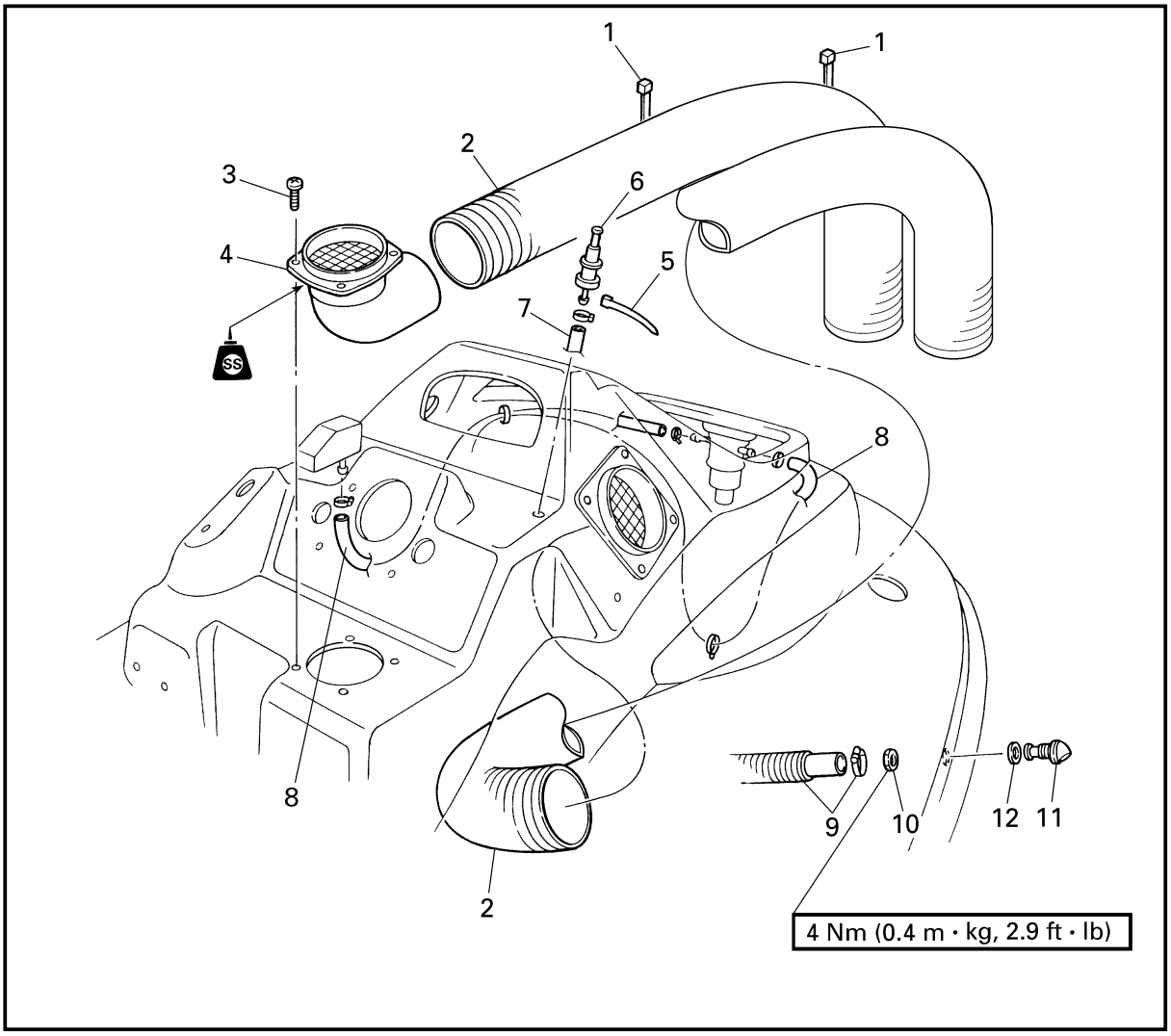
HOSES
EXPLODED DIAGRAM



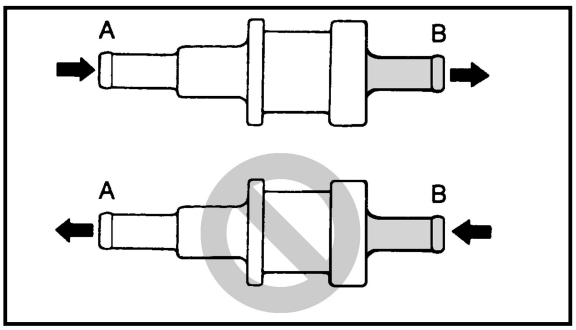
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	HOSES REMOVAL		Follow the left "Step" for removal.
	Steering master cover		Refer to "STEERING MASTER COVER".
1	Band	2	
2	Ventilation hose	2	
3	Screw	4	
4	Ventilation duct	1	
5	Band	1	
6	Check valve	1	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
7	Oil tank breather hose	1	
8	Fuel tank breather hose	2	
9	Clamp/pilot water hose	2/2	
10	Nut/washer	2/2	
11	Pilot water outlet	2	
12	Packing	2	
			Reverse the removal steps for installation.



SERVICE POINTS

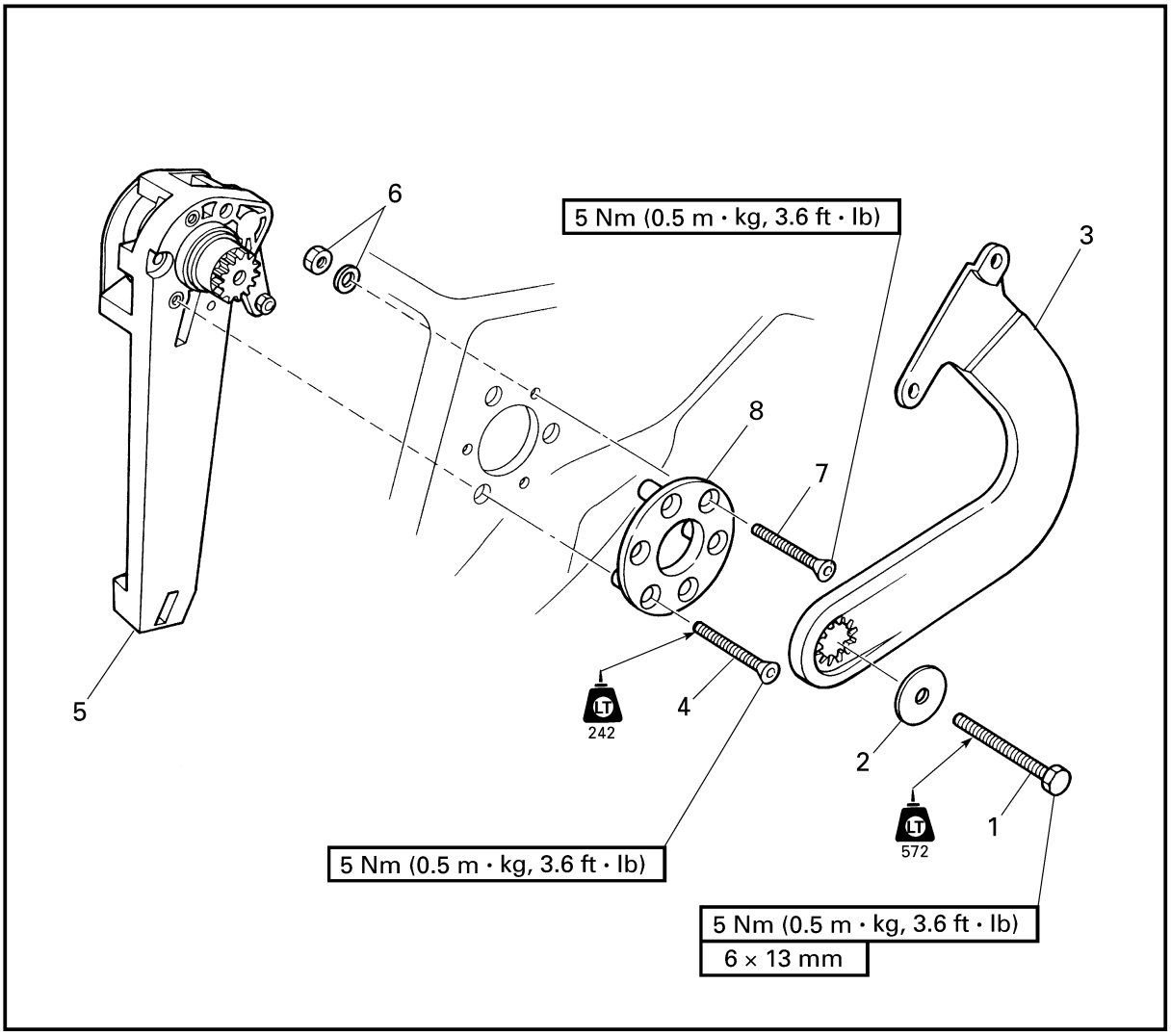
Check valve inspection

1. Check:
   - Check valve
     Faulty → Replace.

Checking steps:
- Connect a hose to the end of check valve "A" and blow into it.
  Air should come out from end "B".
- Connect the hose to the end of check valve "B" and blow into it.
  Air should not come out from end "A".

SHIFT LEVER

EXPLODED DIAGRAM

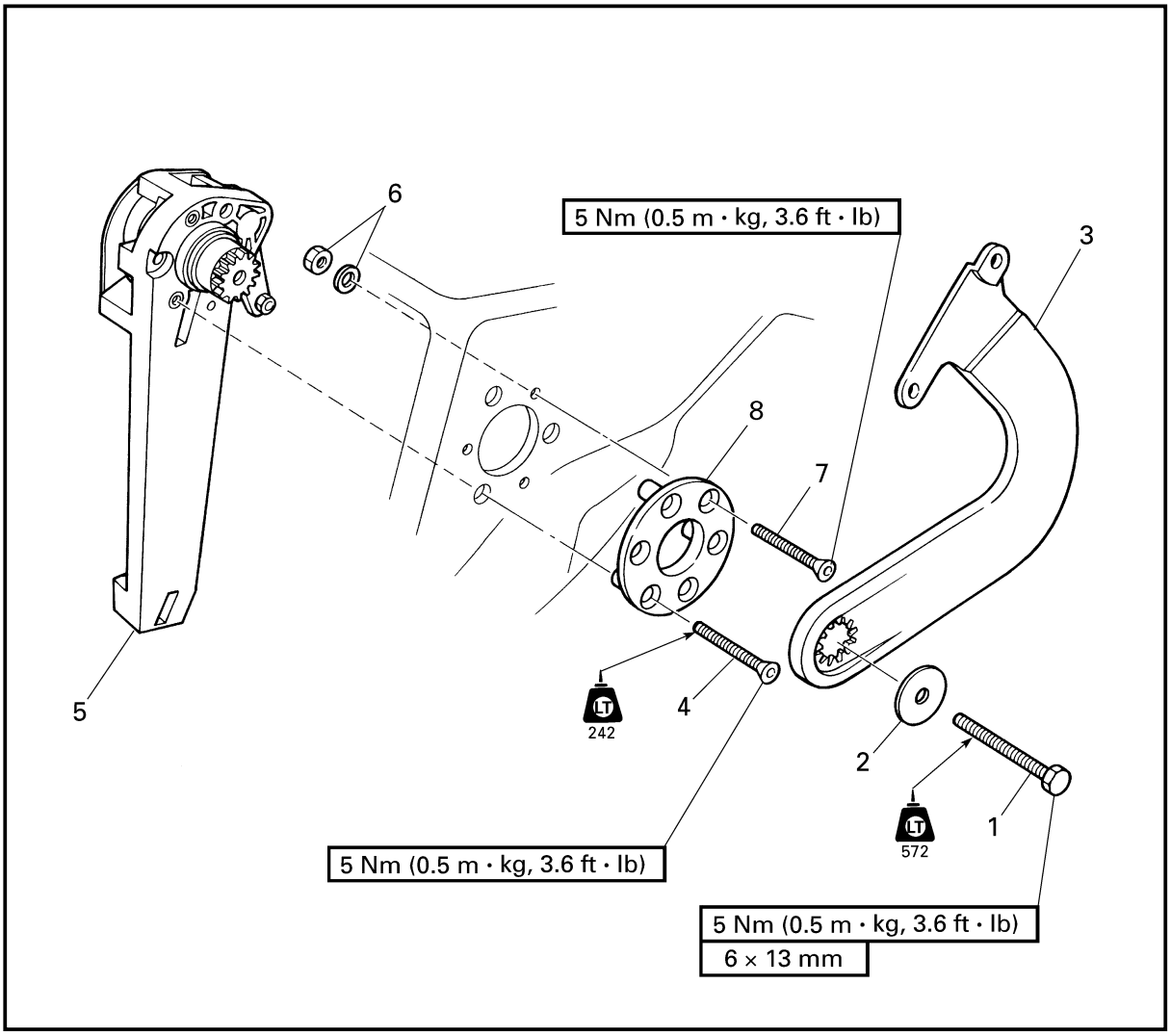


REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	SHIFT LEVER REMOVAL		Follow the left "Step" for removal.
	Steering master cover		Refer to "STEERING MASTER COVER".
	Shift cable		Refer to "REMOTE CONTROL CABLES AND SPEED SENSOR LEAD".
	Ventilation duct		Refer to "HOSES".
1	Bolt	1	
2	Washer	1	
3	Shift lever	1	Mark its original position

SHIFT LEVER

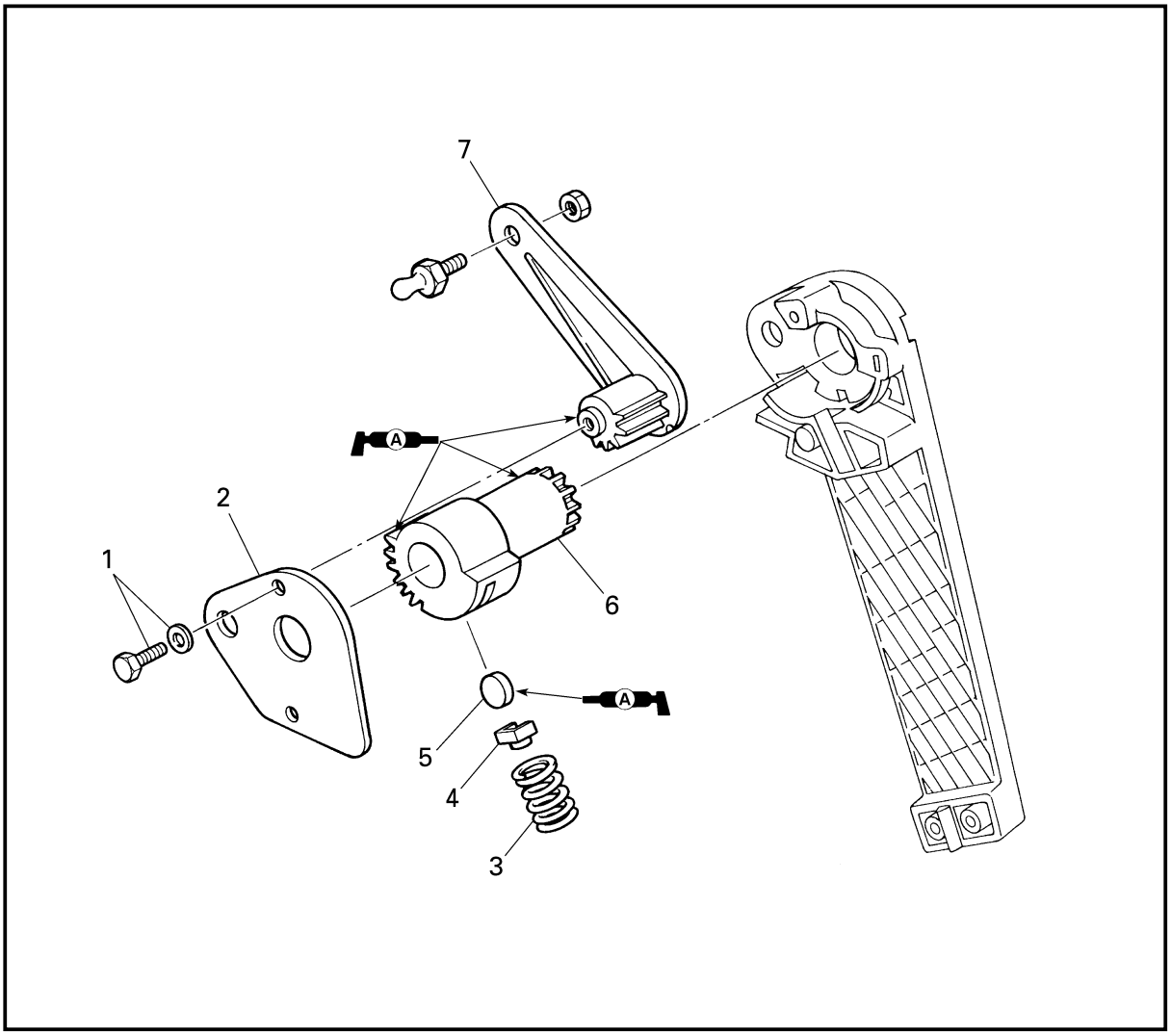
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

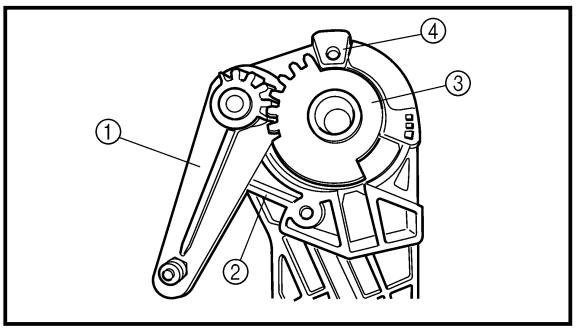
Step	Procedure/Part name	Q'ty	Service points
4	Screw	3	
5	Base assembly	1	
6	Nut/washer	3/3	
7	Screw	3	
8	Plate	1	
			Reverse the removal steps for installation.

EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	BASE DISASSEMBLY		Follow the left "Step" for disassembly.
1	Bolt/washer	2/2	
2	Plate	1	
3	Spring	1	
4	Actuator	1	
5	Roller	1	
6	Shaft	1	
7	Shift arm	1	
			Reverse the disassembly steps for assembly.



SERVICE POINTS

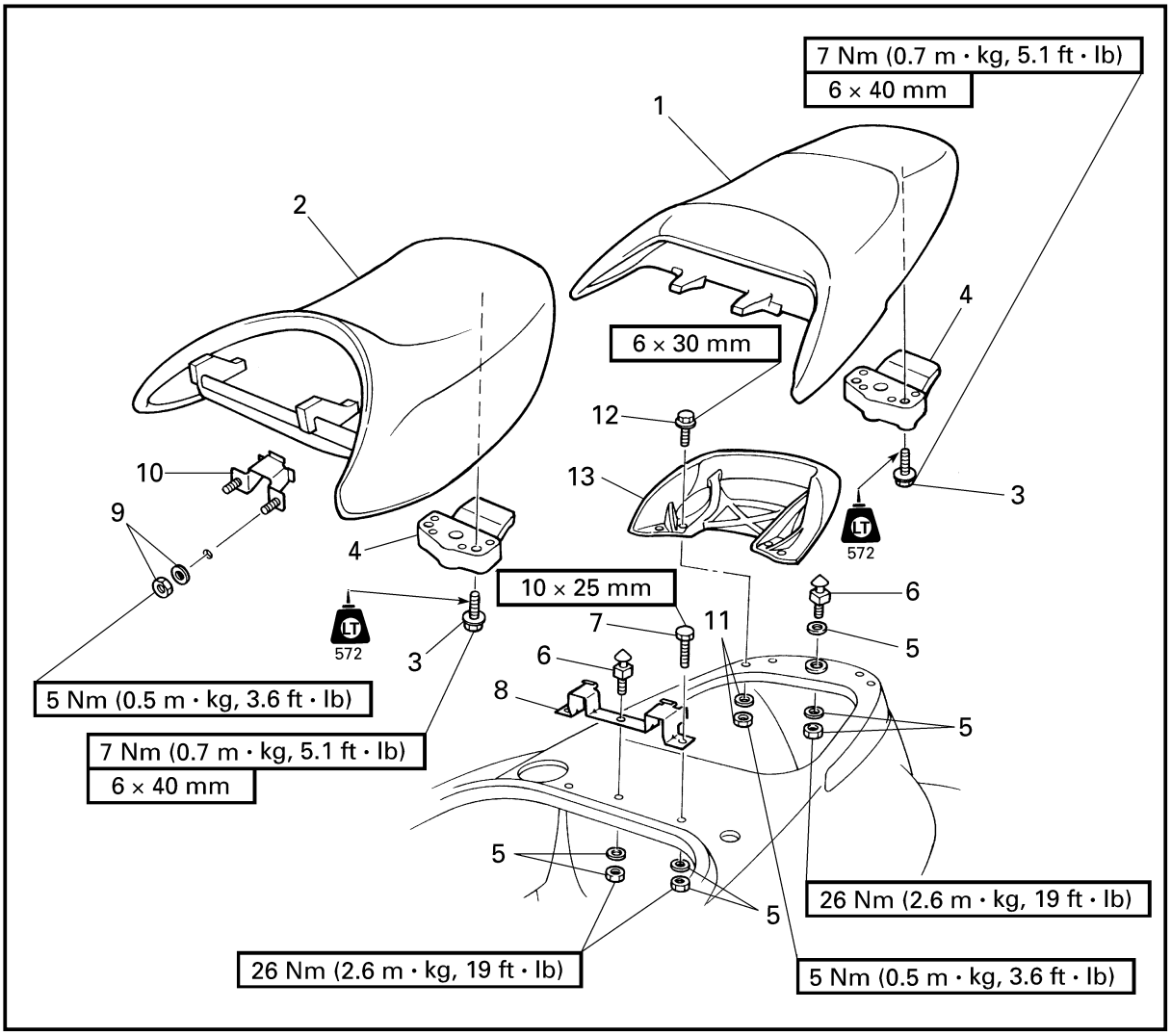
Base assembly

1. Install:
   - Shift arm
   - Shaft

Installation steps:

- Install the shift arm ① so that it comes in contact with the stopper ② as shown.
- Install the shaft ③ to the base so that it come in contact with the stopper ④ as shown.

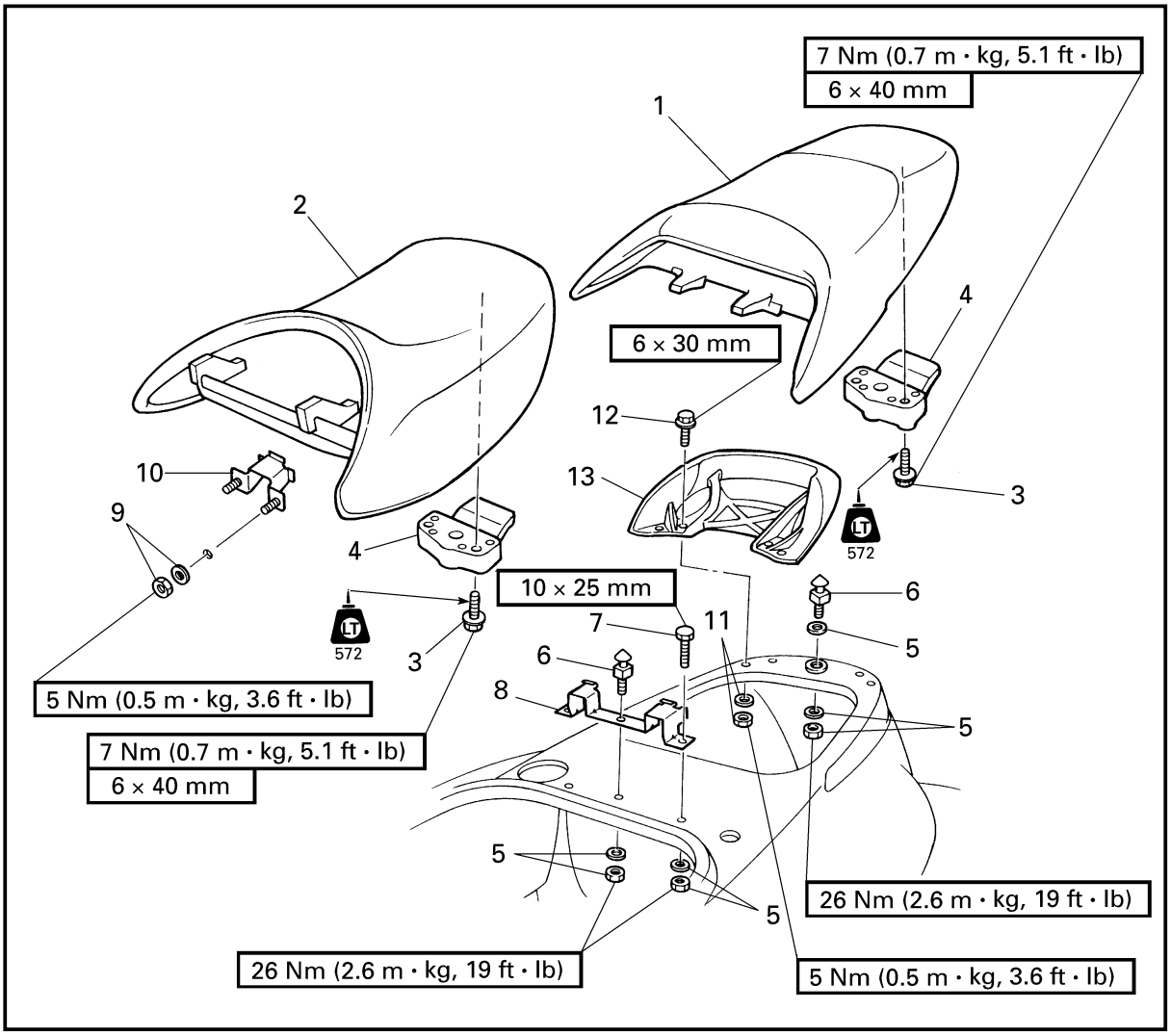
SEATS AND HAND GRIP
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	SEATS AND HAND GRIP REMOVAL		Follow the left "Step" for removal.
1	Rear seat assembly	1	
2	Front seat assembly	1	
3	Bolt	4	
4	Seat lock assembly	2	
5	Nut/washer	4/5	
6	Notch	2	
7	Bolt	2	

EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
8	Rear seat stay	1	
9	Nut/washer	4/4	
10	Front seat stay	2	
11	Nut/washer	4/4	
12	Bolt	4	
13	Hand grip	1	
			Reverse the removal steps for installation.

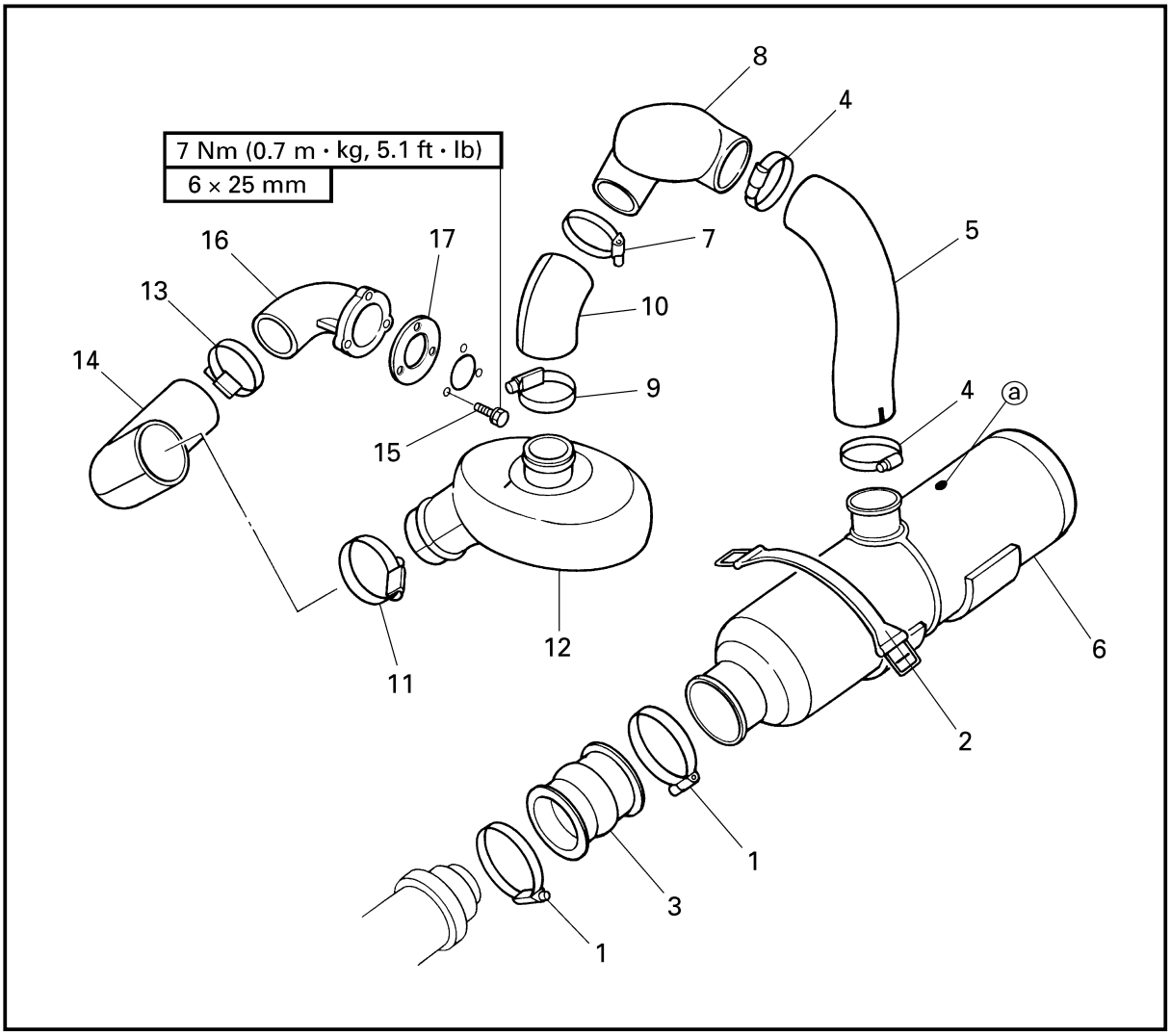
SERVICE POINTS

Seat lock inspection

1. Inspect:
   - Front seat lock
   - Rear seat lock

   Damage/wear → Replace.

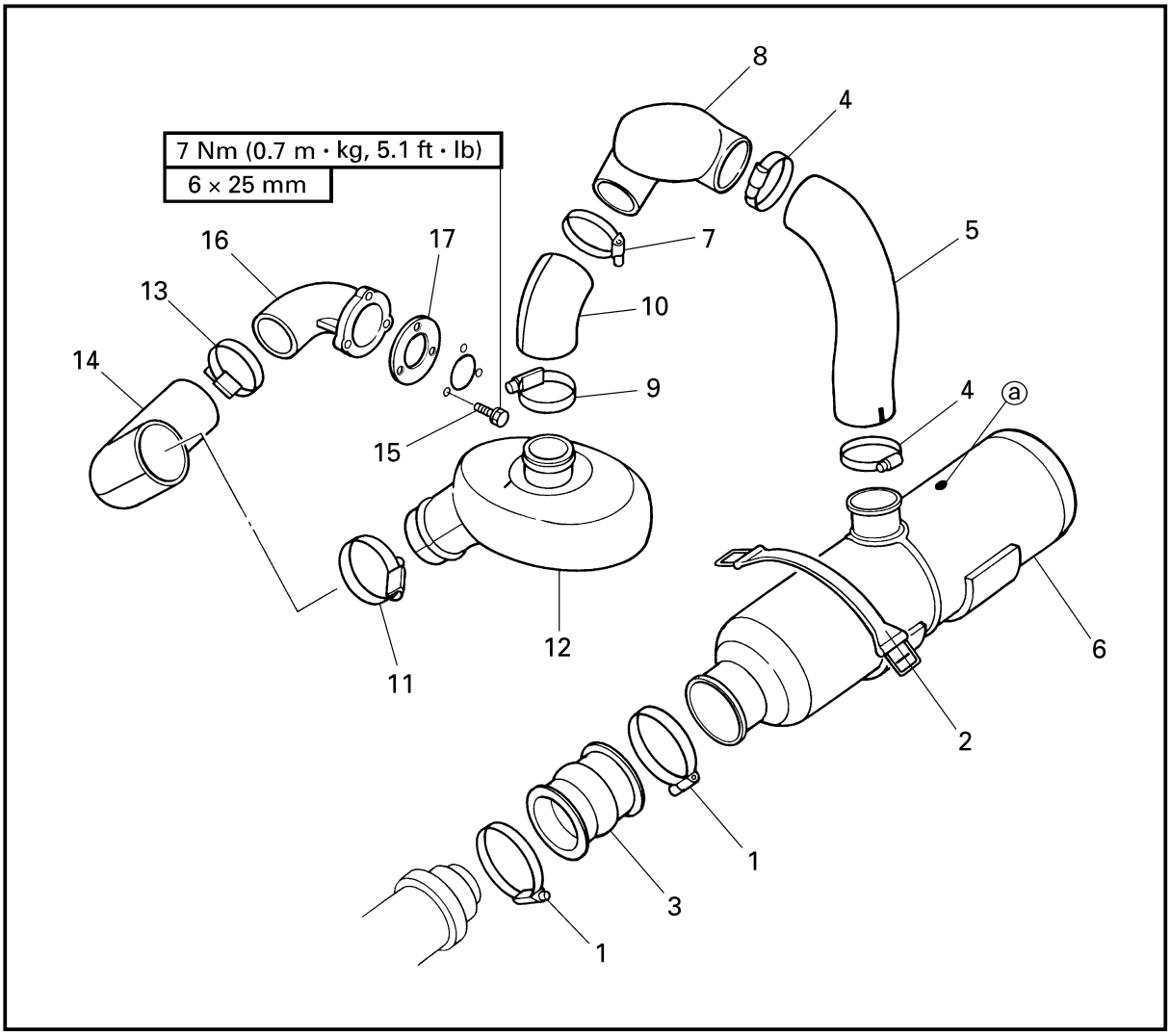
EXHAUST SYSTEM
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	EXHAUST SYSTEM REMOVAL		Follow the left "Step" for removal.
1	Hose clamp	2	
2	Band	1	
3	Rubber joint	1	Slide the water lock to back
4	Hose clamp	2	
5	Rubber hose	1	Align mark with weld line
6	Water lock	1	Mark ⓐ should be upside
7	Hose clamp	1	
8	Resonator assembly	1	

EXPLODED DIAGRAM



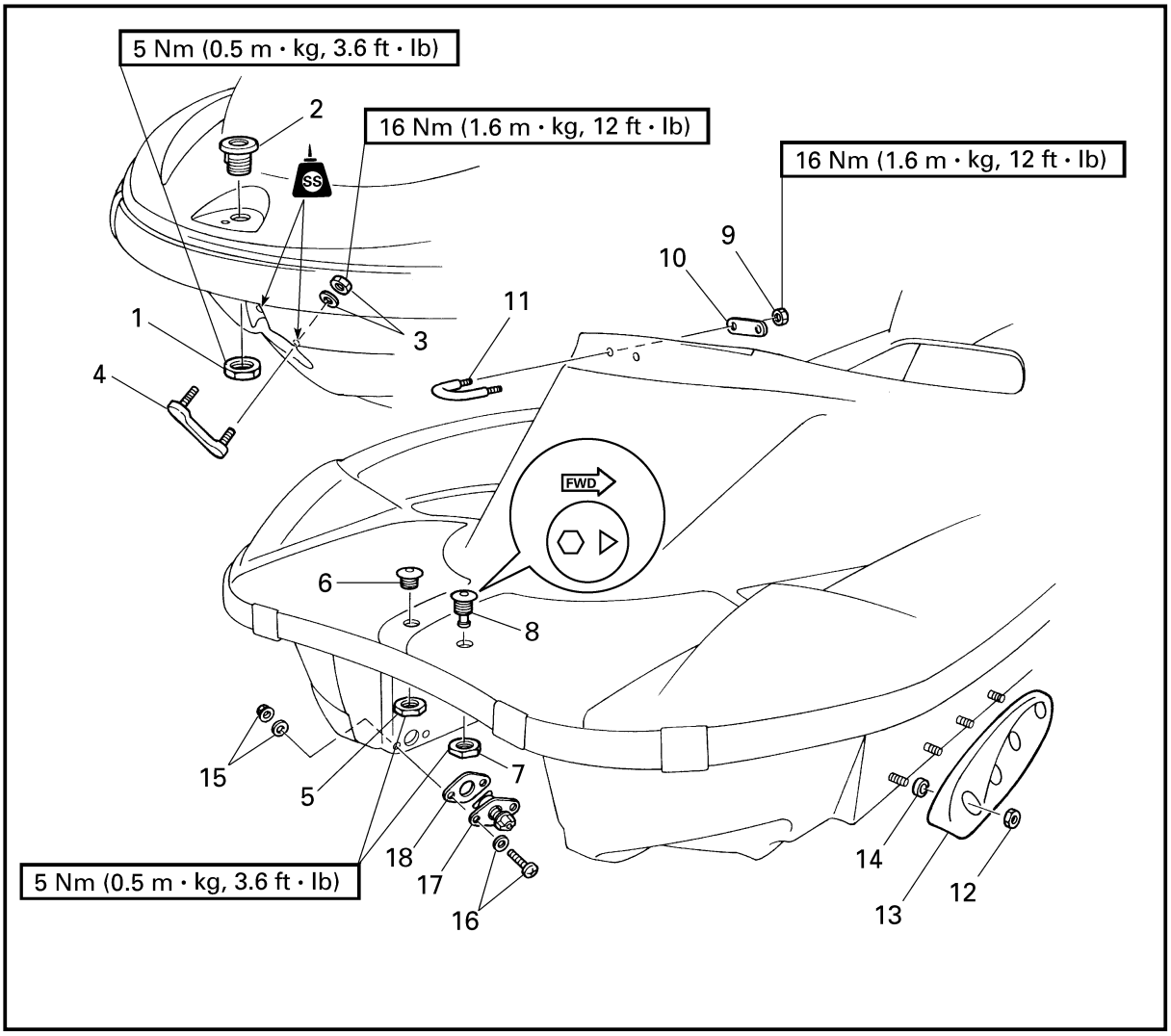
Step	Procedure/Part name	Q'ty	Service points
9	Hose clamp	1	
10	Rubber hose	1	Align hose parting line with tank mark
11	Hose clamp	1	
12	Water tank	1	
13	Hose clamp	1	
14	Rubber hose	1	Align hose parting line with tank parting line
15	Bolt	3	
16	Exhaust outlet	1	
17	Packing	1	
			Reverse the removal steps for installation.

SERVICE POINTS

Exhaust system inspection

1. Inspect:
   - Water lock band
     Cracks → Replace.
2. Inspect:
   - Rubber hoses
     Burns/cracks/damage → Replace.
3. Inspect:
   - Water lock
     Cracks/leaks → Replace.
     Water → Drain.
4. Inspect:
   - Resonator
   - Water tank
     Cracks/damage → Replace.

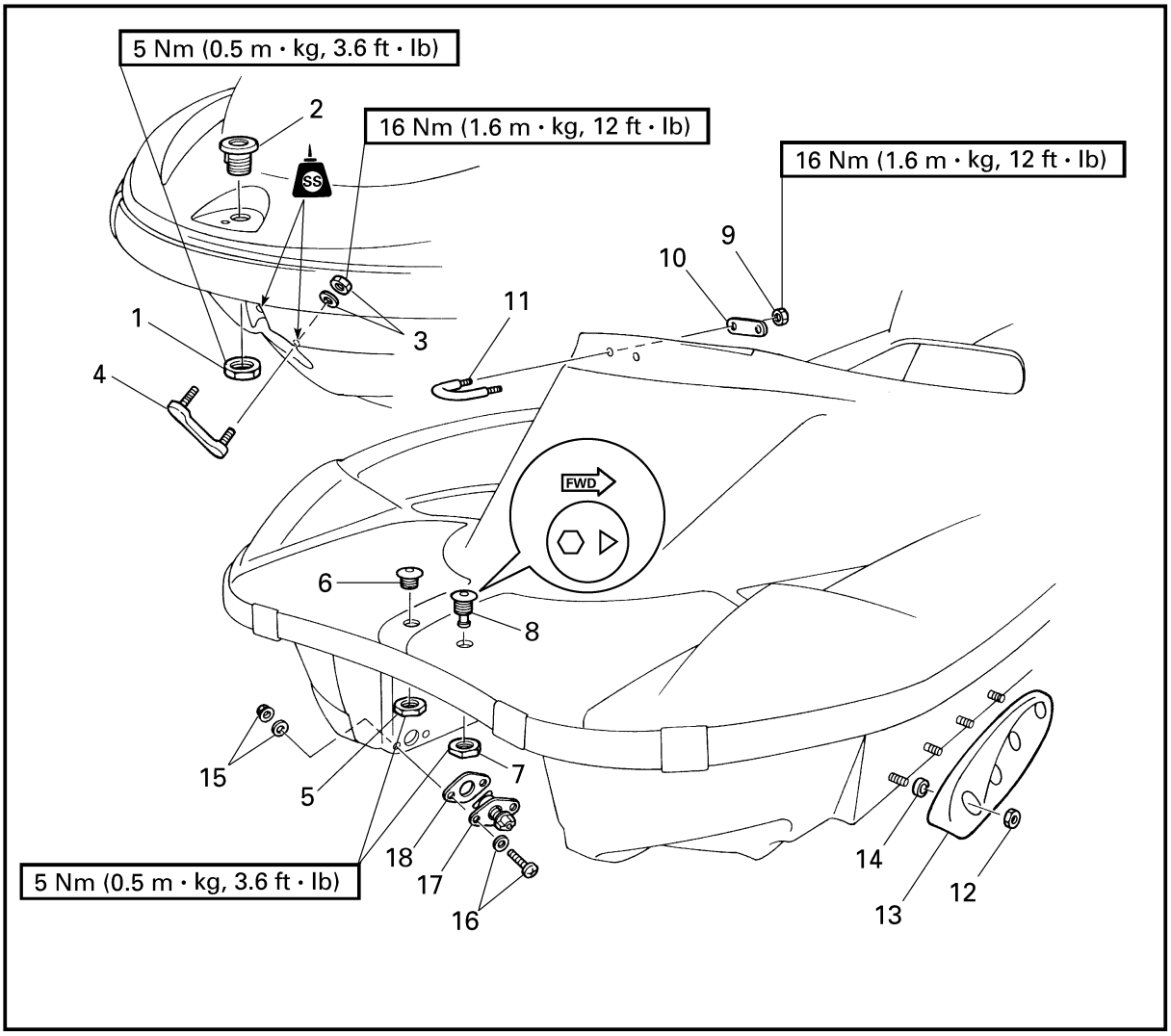
DECK AND HULL
EXPLODED DIAGRAM



REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	DECK AND HULL DISASSEMBLY		Follow the left "Step" for disassembly.
1	Nut	1	
2	Rope hole bolt	1	
3	Nut/washer	2/2	
4	Bow eye	1	
5	Nut	1	
6	Rope hole bolt	1	
7	Nut	1	
8	Spout	1	
9	Nut	2	

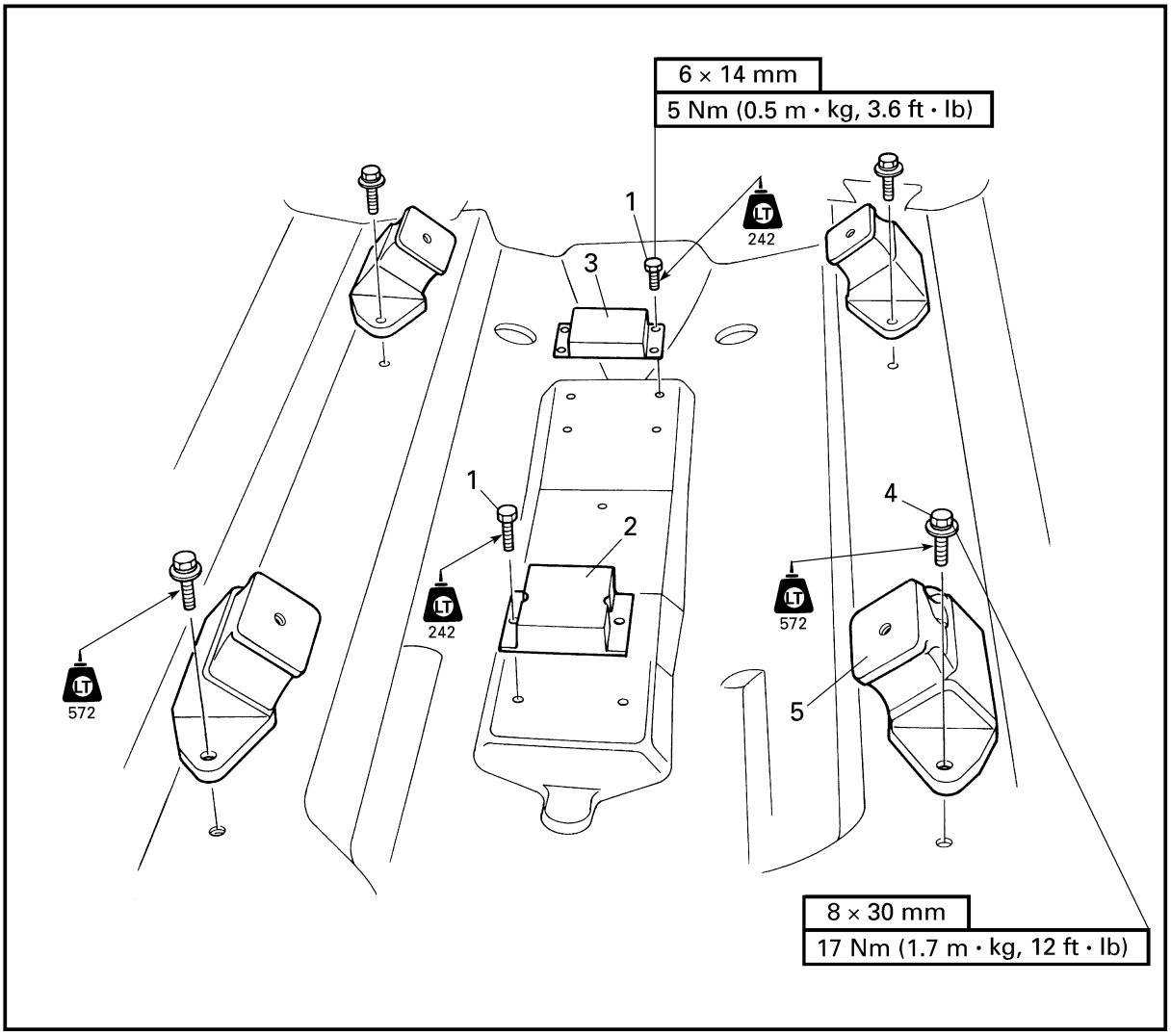
EXPLODED DIAGRAM



Step	Procedure/Part name	Q'ty	Service points
10	Plate	1	
11	Cleat	1	
12	Nut	8	
13	Sponson	2	
14	Spacer	8	
15	Nut/washer	4/4	
16	Screw/washer	4/4	
17	Drain plug	2	
18	Packing	2	
			Reverse the disassembly steps for assembly.

ENGINE MOUNT

EXPLODED DIAGRAM



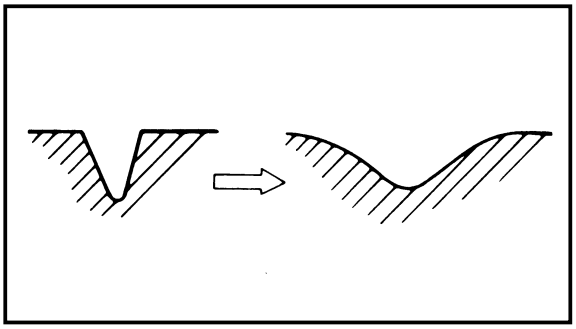
REMOVAL AND INSTALLATION CHART

Step	Procedure/Part name	Q'ty	Service points
	ENGINE MOUNT REMOVAL		Follow the left "Step" for removal.
	Engine assembly		Refer to "ENGINE UNIT" in chapter 5.
1	Bolt	6	
2	Damper 1	1	
3	Damper 2	1	
4	Bolt	8	
5	Engine mount	4	
			Reverse the removal steps for installation.

HULL REPAIR

Shallow scratches

1. Sand the scratches with 400 grit sandpaper (either wet or dry) until the scratches are smooth. Then, sand the scratches once again with 600 grit sandpaper (either wet or dry).

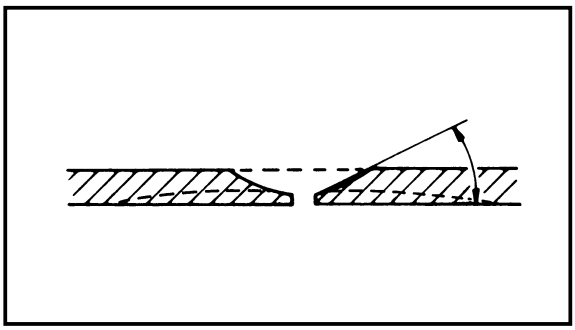


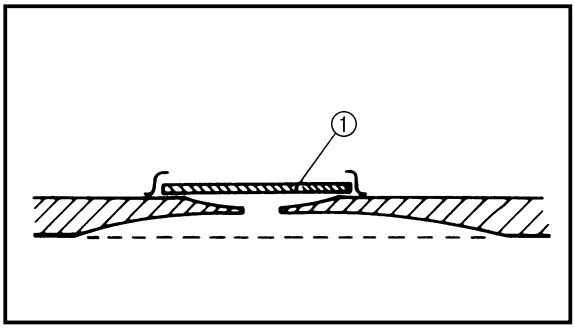
Deep scratches

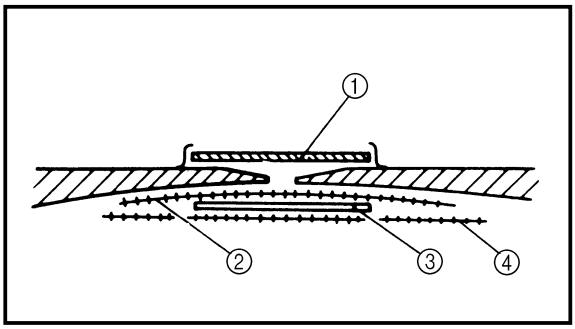
1. Remove any sharp or rough edges from the hull surface.
2. Sand the scratches and a 1-inch circumference around them with 80 grit sandpaper (either wet or dry).
3. Clean the entire area with acetone and let it completely dry.
4. Mix gel-coat and gel-coat thickener to form a putty, and then add the catalyst to the putty.
5. Apply the putty, spread it with a squeegee, and then cover the putty with wax paper.
6. When the putty has set, sand it. Smooth the area with 80 ~ 400 grit sandpaper (either wet or dry) and a sanding block.
7. Clean the area with a dry cloth and then polish it.

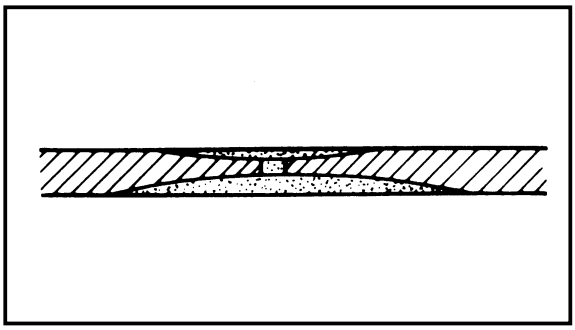
⚠ WARNING

Resins, catalysts, and solvents are flammable and toxic; only use them in a well-ventilated area and keep them away from open flames and sparks. Always follow the manufacturer's instructions and warnings.









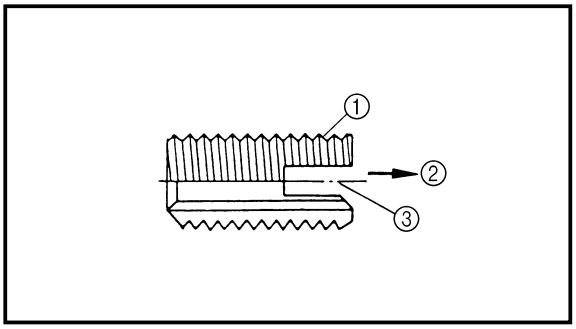
Cracks and punctures

NOTE:
Before attempting to repair any cracks or punctures, refer to "WATER VEHICLE FRP REPAIR MANUAL".

1. Remove any damaged fiberglass.
2. Cut the damaged area and separate it approximately 0.25 inch.
3. On the outside of the hull, grind the separated edge of the area to less than 5° as shown.
4. Working from inside the hull, grind the damaged area approximately 4 inches beyond the damage.
5. Clean the area with acetone, apply BP-1 or an equivalent primer onto both sides of the damaged area, and then allow it to cure for approximately 30 minutes.
6. Cover a piece of cardboard with wax paper ① and then cover the damaged area with it.
7. Combine the polyester resin and the catalyst, and then apply the mixture onto the hull.
8. Install a glass mat ② (2 inches smaller than the ground area).
9. Apply the resin.
10. Install a 20 oz. fiberglass cloth ③ (1 inch smaller than the glass mat).
11. Apply the resin.
12. Install another glass mat ④ (1 inch smaller than the ground area).
13. When the resin has hardened remove the piece of cardboard.
14. Finish the outer surface.
    Refer to steps (3) ~ (7) in the "Deep scratches" section.

Insert nut

NOTE:
Use the insert nut when:
- A pop nut which was attached to the hull slipped off or,
- When a bolt which was fastened to an insert nut or pop nut broke.

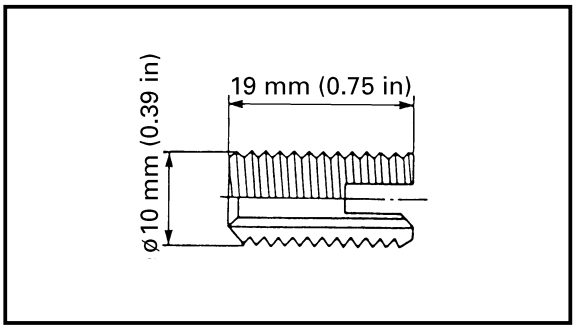


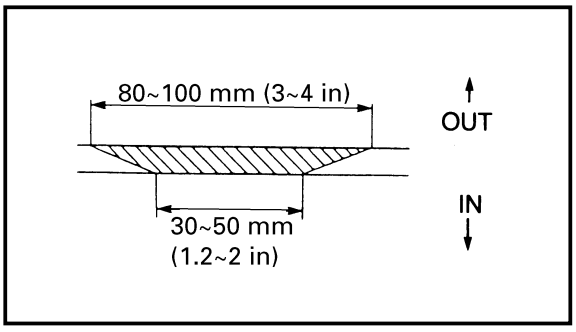
Part No.	Part name	Remarks
EW2-62733-09	Nut	Stainless steel, M6

- Nut ①
- Thread direction ②
- Slot to be threaded ③

NOTE:
Drilling size

Material	Pilot hole diameter
FRP or SMC	9.1 ~ 9.2 mm (0.36 in)
Brass	9.4 mm (0.37 in)



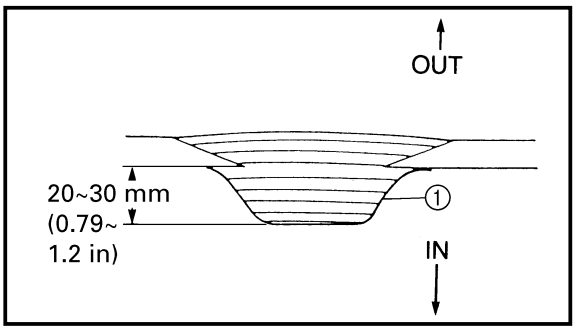


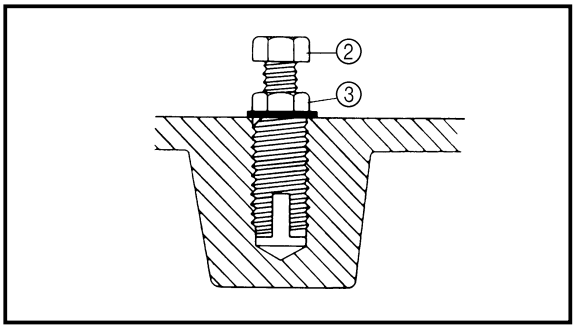
Example 1:

NOTE:
Before attempting to install the insert nut, refer to "WATER VEHICLE FRP REPAIR MANUAL".

The insert nut is used to repair the pop nut designed for the ride plate.
(By repairing the FRP portion, the insert nut can be used for all models.)

1. Remove:
   - Pop nut
2. Clean the surface to be scarfed and the inside of the hull with acetone.
3. Scarf the shaded portion of the hull.





4. First, apply tape ① to the inner surface of the hull and then laminate fiberglass mats over the tape with resin.

NOTE:
When it is possible to work inside the hull, laminate the mats from the inside.

5. Sand the outer surface of the hull until it is smooth.
6. Install the ride plate.
7. Drill a 20 mm (0.79 in) deep hole in the center of the laminated fiberglass layers with a 9.2 mm (0.36 in) diameter drill bit.
8. Pass the bolt ② through the insert nut and lock the bolt with the nut ③ as shown.
9. Screw in the insert nut so that the top is flush with the FRP surface.
10. Loosen the locknut and remove the bolt.

CAUTION:
- **Only use a steel bolt with a tensile strength of 8T or more.**
- **If the bolt is inferior in strength or is made of stainless steel it may break.**

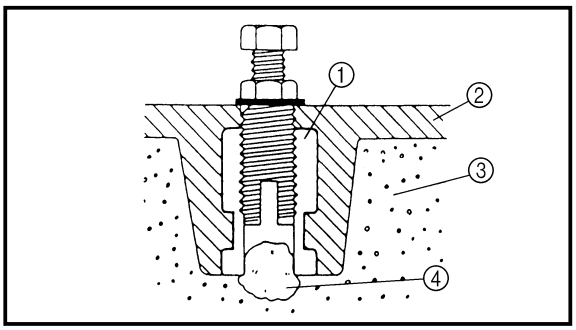
- Bolt ②
- Locknut ③

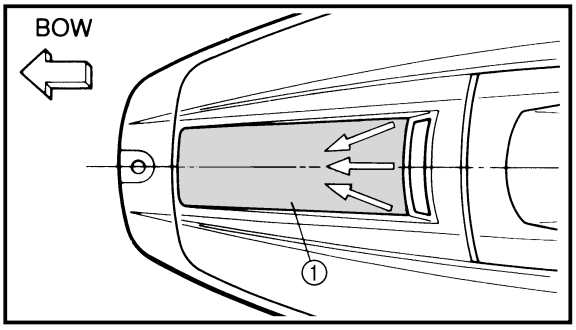
Example 2:
The brass insert nut, which is designed for the Super Jet ride plate or the intake screen, is used as follows.

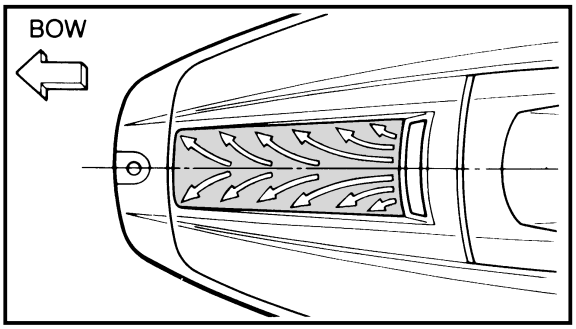
NOTE:
If the bolt is broken, drill it out.

1. Drill a hole in the hull.

NOTE:
- First, use a small-diameter drill bit followed by drill bits of gradually increasing diameter.
- Use a 9.4 mm (0.37 in) drill bit for the final drilling.







2. To prevent water from entering the urethane foam, apply silicone sealant to the inside of the hole as shown.
3. Install the insert nut as explained in "Example 1".
   - Brass insert nut ①
   - Hull ②
   - Urethane foam ③
   - Silicone sealant ④

Graphic removal

1. Hold a hair dryer approximately 1.5 inches above the graphic ①.
2. Apply heat to one corner of the graphic.
3. Slowly peel off the heated portion of the graphic and continue working until you reach the opposite corner and the entire graphic is removed.
4. After the graphic is removed, clean the entire bow area with isopropyl alcohol to remove any residual adhesive.

Graphic installation

1. Mix 1 tablespoon of liquid detergent and water in a 1-quart spray bottle.
2. Remove the backing from the new graphic.
3. Spray the soap and water mixture onto both sides of the graphic, and also onto the hull area where the graphic will be installed.

NOTE:

Spraying the front of the graphic with the soap and water mixture will protect it from being scratched during installation.

4. Align the graphic onto the fitting area of the hull and position it with a squeegee.

NOTE:

Be sure to remove any air bubbles from the graphic with the squeegee. Work from the top of the graphic down and slide the squeegee outwards from the graphic's center line.

5. Allow the graphic to dry before waxing or using the water vehicle.

CHAPTER 9
TROUBLE-ANALYSIS

TROUBLE-ANALYSIS

NOTE:

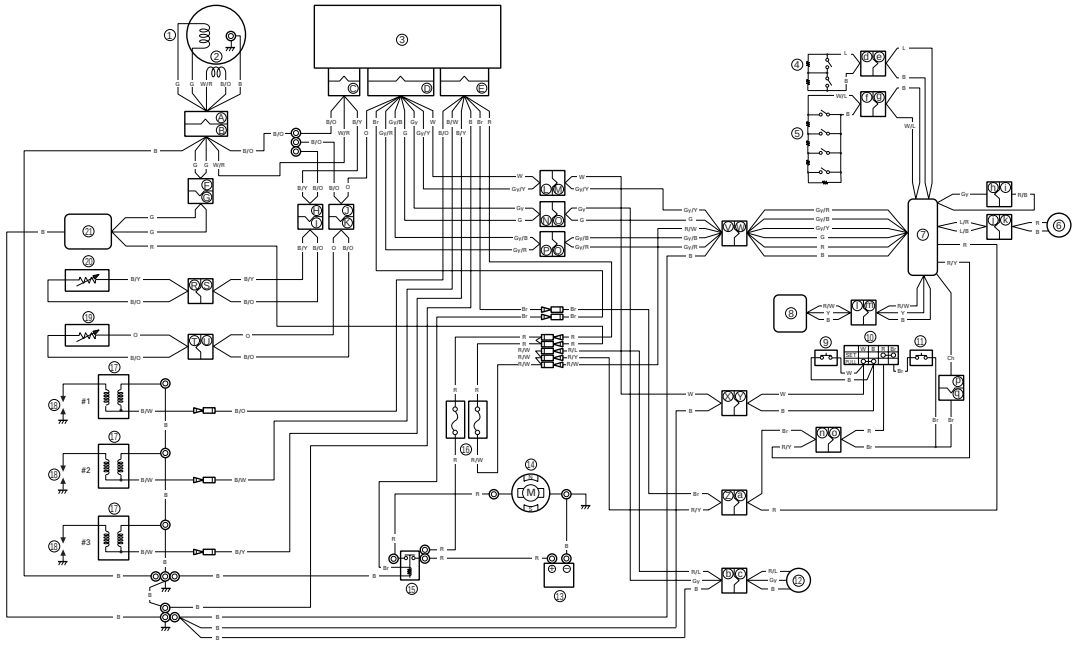
The following items should be checked before the "Trouble-analysis" chart is consulted.
1. The battery is charged and its specified gravity is within specification.
2. There are no incorrect wiring connections.
3. Wiring connections are properly secured and not rusty.
4. The lock plate is attached to the engine stop lanyard switch.
5. Fuel is reaching the carburetors.

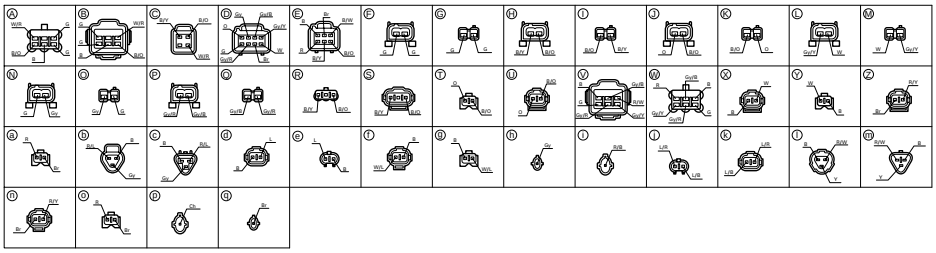
TROUBLE-ANALYSIS CHART

Problems											Items to be checked	
ENGINE WILL NOT START	ROUGH IDLING	ENGINE STALLS	ENGINE WILL NOT STOP	POOR PERFORMANCE	OVERHEATING	LOOSE STEERING	BILGE INCREASE	IRREGULAR WARNING INDICATION	POOR BATTERY CHARGING	YPVS SERVOMOTOR DOES NOT MOVE	Items	Reference chapter
											FUEL SYSTEM	
○	○	○		○							Fuel tank	4
○	○	○		○							Air vent hose	4
○	○	○		○							Fuel hose	4
○	○	○		○							Fuel filter	4
○	○	○		○							Fuel pump	4
○	○	○		○							Carburetors	4
	○	○		○							Carburetor synchronization	4
		○		○							Trolling speed	3
											POWER UNIT	
○				○							Spark plug(s)	3
○	○			○							Compression	5
○	○			○							Reed valves	5
○	○			○							Cylinder head gasket	5
○				○							Piston rings	5
○				○							Cylinder block	5
○				○							Seals	5
○				○							Crankcase	5
○				○							Pistons	5
	○			○							Bearings	5
				○							Bearing housing	5
	○			○							Couplings	5

Problems											Items to be checked	
ENGINE WILL NOT START	ROUGH IDLING	ENGINE STALLS	ENGINE WILL NOT STOP	POOR PERFORMANCE	OVERHEATING	LOOSE STEERING	BILGE INCREASE	IRREGULAR WARNING INDICATION	POOR BATTERY CHARGING	YPVS SERVOMOTOR DOES NOT MOVE	Items	Reference chapter
				○							Rubber coupling	5
					○		○				Pilot water hose	5
					○		○				Water hose	5
					○		○				Water passage	5
											JET PUMP UNIT	
				○	○		○				Duct	6
				○							Impeller	6
				○	○						Intake screen	6
	○			○							Bearings	6
				○	○						Intake duct	6
					○						Water inlet hose	6
							○				Bilge hose	6
							○				Bilge strainer	6
							○				Bilge hose joint	6
							○				Valve body	6
											ELECTRICAL	
○	○	○	○	○				○		○	CDI unit	7
		○							○		Lighting coil	7
○		○		○							Pickup coil (Pulser coil)	7
○		○		○							Ignition coil	7
				○					○		Rectifier/regulator	7
○		○						○			Electrical sender(s)	7
○											Starter relay, starter motor	7
				○						○	YPVS unit	7
○									○		Battery	3
○									○		Fuse(s)	7
○				○					○	○	Wire harness, electrical coupler(s)	7
											HULL AND HOOD	
						○					Steering master	8
				○			○				Water lock	8
		○		○			○				Exhaust hose	8
				○			○				Muffler	8
							○				Drain plugs	8

WIRING DIAGRAM





① Lighting coil
② Pickup coil
③ CDI unit
④ Oil level sensor
⑤ Fuel level sensor
⑥ Buzzer
⑦ Multi-function meter
⑧ Speed sensor
⑨ Engine stop switch
⑩ Engine stop lanyard switch
⑪ Start switch
⑫ YPVS servomotor
⑬ Battery
⑭ Starter motor
⑮ Starter relay
⑯ Fuse
⑰ Ignition coil
⑱ Spark plug
⑲ Exhaust temperature sensor
⑳ Water temperature sensor
㉑ Rectifier/regulator

B : Black
Br : Brown
Ch : Chocolate
G : Green
Gy : Gray
L : Blue
O : Orange
R : Red
W : White
Y : Yellow
B/O : Black/Orange
B/W : Black/White
B/Y : Black/Yellow
Gy/B : Gray/Black
Gy/R : Gray/Red
Gy/Y : Gray/Yellow
L/B : Blue/Black
L/R : Blue/Red
R/B : Red/Black
R/L : Red/Blue
R/W : Red/White
R/Y : Red/Yellow
W/L : White/Blue
W/R : White/Red

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